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UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

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ILLINOIS

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Introduction

The University of Illinois at Urbana-Champaign

Since its founding in 1867, the University of Illinois at Urbana-Champaign has earned a reputation as an institution of international stature. It is recognized for the high quality of its academic programs and for the outstanding facilities and resources it makes available to students and faculty, including the University Library, the largest public university library in the world, with over 40 departmental libraries and units in locations across the campus.

The University of Illinois at Urbana-Champaign is a comprehensive institution offering undergraduate, graduate, and professional degrees in more than 150 fields of study. There are approximately 36,300 students (27,400 undergraduate; 8,900 graduate and professional) and 12,500 faculty and staff members.

This Catalog

This is one of two catalogs describing study at the University of Illinois at Urbana-Champaign. The *Programs of Study* catalog gives detailed information relating to admission, costs, programs, and requirements for undergraduate students and graduate students. This catalog gives information about all courses, both undergraduate and graduate, that are currently available at the University as possible offerings. Courses listed in this catalog are subject to revision without advance notice and are not necessarily offered each semester or year. Individual departments or units should be contacted for information regarding regularity of course offerings.

Course Rubric and Number

Courses are listed in alphabetical order by departments, and then alphabetically by rubric. For instance, the Department of English lists its courses under three separate rubrics: Business and Technical Writing, English, and Rhetoric and Composition. Courses are listed in numerical order within the individual rubric. The course number denotes the level of the course:

100-198 are intended primarily for freshmen and sophomores, although they may also be taken by juniors and seniors. In certain instances they may be taken by graduate students to make up undergraduate deficiencies, but they may not be taken for graduate credit.

199 (Undergraduate Open Seminars) are special courses for independent study, for experimentation, or for seminars on topics not treated by regularly scheduled courses. Requests for initiation of the course and suggestions for areas of study may be made by students or faculty. The seminar may be offered only with the approval of the faculty member involved and the department head. A student may accumulate an unlimited number of credit hours in 199 courses, but no more than 12 such hours listed on the student's transcript may be counted toward fulfilling graduation requirements. Exceptions to this rule are made in cases where a larger number of credit hours in 199 courses is an integral part of a formal, college-approved program of study (such as Individual Plans of Study or Unit One).

200-299 are intended for undergraduate students who satisfy the published prerequisite(s), if any. In certain instances, these courses may be taken by graduate students to make up undergraduate deficiencies, but they may not be taken for graduate credit.

300-399 are intended primarily for juniors, seniors, and professional and graduate students who satisfy published prerequisite(s), if any.

These courses are offered for either undergraduate credit (expressed in hours) or graduate credit (expressed in units). Only graduate students and certain seniors with Graduate College approval may receive graduate credit.

400-499 are available for professional and graduate students, and for certain seniors with Graduate College approval to register for graduate credit (expressed in units).

Course Description

Following the title of each course is a brief description of the content, the requirements for admission to the course (if any), and the credit given. Additional information relating to the course content is available from the department offering the course.

Special requirements for admission to certain courses are introduced by the word **prerequisite**. Sometimes a course will list as a prerequisite a particular class standing—e.g., "junior standing." An undergraduate must have 30 hours of credit to be classified as a sophomore, a minimum of 60 hours to be classified as a junior, and a minimum of 90 hours to be classified as a senior. A graduate student is a person who has been admitted to the Graduate College.

A course which is offered under the same name in different departments is a **crosslisted** course. Courses may be crosslisted with one or several departments; each listing carries a "Same as" statement indicating all the crosslisting rubrics. The description of a crosslisted course is generally found only under the heading of the controlling department, indicated by a separate "See" statement.

Course Credit

Credit for undergraduate students is counted in semester hours. A semester hour represents the work of one classroom period for fifty minutes each week through one semester (two periods per week in an eight-week summer session), or the equivalent in laboratory or field work, or approved independent study. In descriptions of courses, "3 hours" means 3 hours of credit each semester or summer session.

Credit for graduate students taking courses numbered 300 and above typically is counted in units. One unit is usually considered the equivalent of 4 semester hours of credit.

Campus Information

University of Illinois administrative offices at Urbana-Champaign are open Monday through Friday from 8:30 a.m. to 5:00 p.m., except on all-campus holidays, which are indicated in the University Calendar.

The Illini Union Information Desk, in the north lobby of the Illini Union, 1401 West Green Street, Urbana, provides information and assistance to all visitors. The desk is open 8 a.m.-8 p.m. Monday through Saturday and 10 a.m.-6 p.m. Sunday during the academic year; 8 a.m.-8 p.m. Monday through Saturday during intersession; and 8 a.m.-5 p.m. Monday through Friday when classes are not in session. Visitors may also telephone (217) 333-INFO for campus information.

The Visitors Center, on the first floor of the Levis Faculty Center, 919 West Illinois Street, Urbana, welcomes prospective students and other visitors to the University. It is open Monday through Friday (except University holidays). The programs, offered daily at 10 a.m. and 1 p.m., include a media presentation, a discussion about admissions, an introduction to the University residence halls, and a campus tour.

Further information about the University of Illinois at Urbana-Champaign, including this catalog, the *Programs of Study* catalog, and the timetables, may be found on the University home page on the World Wide Web at <http://www.uiuc.edu>.

Illinois Articulation Initiative

The University of Illinois at Urbana-Champaign has agreed to participate in the Illinois Articulation Initiative (IAI), a statewide agreement that allows transfer of the completed Illinois General Education Core

Curriculum between participating institutions. Completion of the transferable General Education Core Curriculum at any participating college or university in Illinois assures transferring students that lower-division general education requirements for an associate's or bachelor's degree have been satisfied. This agreement is in effect for students entering an associate- or baccalaureate-degree-granting institution as first-time freshmen in Summer 1998 (and thereafter). Students wishing to transfer from Illinois to another IAI institution should visit the IAI iTransfer Web site at <http://www.itransfer.org/> to see which University of Illinois at Urbana-Champaign courses satisfy the requirements of the IAI General Education Core Curriculum.

Nondiscrimination Statement

The commitment of the University to the most fundamental principles of academic freedom, equality of opportunity, and human dignity requires that decisions involving students and employees be based on individual merit and be free from invidious discrimination in all its forms.

It is the policy of the University of Illinois not to engage in discrimination or harassment against any person because of race, color, religion, sex, national origin, ancestry, age, marital status, disability, sexual orientation, unfavorable discharge from the military, or status as a disabled veteran or a veteran of the Vietnam era and to comply with all federal and state nondiscrimination, equal opportunity, and affirmative action laws, orders, and regulations. This nondiscrimination policy applies to admissions, employment, access to, and treatment in each University program and activity. Complaints of invidious discrimination prohibited by University policy are to be resolved within existing University procedures.

For additional information or assistance on the equal opportunity, affirmative action, and harassment policies of the University, please contact on the Urbana-Champaign campus: Director of Affirmative Action (Title IX, ADA and 504 Coordinator), 202 Swanlund Administration Building, MC-304, 601 East John Street, Champaign, IL 61820; (217) 333-0885.

Students considering enrollment in Military Science, Naval Science, or Air Force Aerospace Studies courses should be aware that University policy prohibits discrimination on the basis of sexual orientation; students may enroll in these courses regardless of sexual orientation. Students seeking to enroll in ROTC are not asked to disclose their sexual orientation. However, homosexual conduct is grounds for disenrollment from the program.

Information contained herein is for informational purposes only and is subject to change without notice. Individual departments and units should be contacted for further information. Courses, faculty assignments, prerequisites, graduation or completion requirements, standards, tuition and fees, and programs may be changed from time to time. Courses are not necessarily offered each semester or each year. The University retains the exclusive right to judge academic proficiency and may decline to award any degree, certificate, or other evidence of successful completion of a program, curriculum, or course of instruction based thereupon. While some academic programs described herein are designed for the purposes of qualifying students for registration, certification, or licensure in a profession, successful completion of any such program in no way assures registration, certification, or licensure by an agency other than the University of Illinois.

Rubric Abbreviations

For a list of official rubric abbreviations (e.g., ACCY for Accountancy), please see Appendix B at the back of this catalog.

ACCOUNTANCY

Head of Department: Eugene Willis
 Department Office: 360 Commerce Building
 (West), 1206 South Sixth Street, Champaign
 Phone: 333-0857
 URL: www.cba.uiuc.edu/accountancy

Accountancy (ACCY)

198. Accounting Practice

Course covers the professional standards relating to corporate financial reporting, taxation, auditing, and public sector reporting. *Prerequisite:* Registration in the University's CPA Review course. 1 to 8 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Fundamentals of Accounting

Survey course in the principles of accounting for students registered in schools and colleges other than Commerce and Business Administration. *Prerequisite:* Sophomore standing. 3 hours. Credit is not given for both ACCY 200 and either 201 or 202.

201. Accounting and Accountancy, I

Introduction to the role of contracts, both implicit and explicit, within business environments, and the role of accounting in providing information for negotiation, execution and monitoring of such contracts. Topics include contracting as a means of coordinating interactions between members of society, the role of information in making various contract-related decisions, accounting information systems, and the roles of accountants in society. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* Sophomore standing. 3 hours. Credit is not given for both ACCY 201 and 200.

202. Accounting and Accountancy, II

Continuation of ACCY 201. *Prerequisite:* ACCY 201. 3 hours. Credit is not given for both ACCY 202 and 200.

290. Cooperative Accounting Education Practice

Off-campus practice in public, private, or governmental accounting for students participating in intern or cooperative (repeated internship) programs. *Prerequisite:* Consent of instructor; internship in accounting curriculum. 0 hours. May be repeated.

299. Senior Research

Research and readings course for students majoring in accountancy. May be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Cumulative GPA of 3.0, honors in the junior year, or consent of instructor; senior standing. 2 to 4 hours. May be repeated to a maximum of 6 hours.

300. Professional Development Workshop
 Professional lyceum and practical workshops on professional skills and attitudes. *Prerequisite:* Credit or concurrent registration in ACCY 301 or 302. 1 hour. May be repeated in subsequent semesters to a maximum of 3 hours.

301. Accounting Measurement and Disclosure

Development and disclosure of organization performance measures, both financial and nonfinancial, for use by individuals both internal and external to the organization. Topics include measurement and disclosure objectives and methods, and the role of measurement and disclosure in design; performance and monitoring of the nexus of contracts from which organizations are formed. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

302. Decision Making for Accountancy

Decision making implications of information provided to organization managers and to external stakeholders such as investors, creditors, customers, and regulators. Concepts from economics, statistics, and psychology emphasize the use of quantitative techniques to comprehend uncertainty and risk. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202 or equivalent and ECON 173 or equivalent, or concurrent enrollment. 3 hours, or $\frac{3}{4}$ or 1 unit.

303. Accounting Institutions and Regulation

Regulation theory and practice as applied to accounting. Topics include regulation of accounting procedures for external reporting, taxation, and rate-setting and other governmental agency activities. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202 or equivalent and ACCY 301 and ECON 300 and FIN 254, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

304. Accounting Control Systems

Introduction to the systems, procedures, and processes management employs to control operating activities, information reporting systems, and compliance with applicable laws, rules, and regulations. Topics include design and evaluation perspectives of control environment, risk assessment, control activities, information and communication and monitoring. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202 or equivalent and ACCY 301 and 302, and B ADM 210, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

305. Assurance and Attestation

Conceptual introduction to the credibility lent by an independent party to the assertions one contracting party makes to other contracting parties. Topics include the demand for assurance and attestation services, and concepts including evidence, ethics, risk, and control. Projects facilitate self-discovery of knowledge and development of professional skills and attitudes. *Prerequisite:* ACCY 202 or

equivalent; and ACCY 304 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

310. Financial Accounting Reporting Standards

Current authoritative accounting standards and applications to accounting practice. Topics do not represent the full range of financial reporting issues, but are selected based on frequency of the underlying business transaction, complexity of the topic, consistency of applicable standard with underlying reporting concepts, and transferability of the standard to other accounting issues. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202 or equivalent; and ACCY 303 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

312. Taxation Rules and Regulations

Taxation of business entities (proprietorships, partnerships, S corporations, and C corporations) and the individuals who own the entities (proprietors, partners, and shareholders). Topics include tax planning, tax rules and regulations, and tax research. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

315. Auditing Standards and Practice

Framework for understanding and evaluating the professional auditing standards for assurance services. Model of financial reporting provides an overview of the types of information disseminated by companies to external users, and provides the basis for identifying professional standards areas for future standards' development. Projects facilitate self-discovery of knowledge and development of a variety of professional skills and attitudes. *Prerequisite:* ACCY 202 or equivalent; and ACCY 305 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

322. Socio-Economic Management as Public Policy

Same as B ADM, POL S and SOC S 300. See POL S 300.

323. Introduction to International Accounting

Explores similarities and differences of accounting principles and procedures between the United States and other countries with special emphasis on worldwide and regional standardization; emphasizes consolidation of foreign subsidiaries, performance evaluation of foreign operations, statement analysis, translation, solutions to inflation accounting, and taxation of multinationals. *Prerequisite:* ACCY 211 and 221, or equivalent; or ACCY 401. 3 hours or $\frac{3}{4}$ unit.

331. Accounting Systems Design

Examines the fundamentals of accounting systems design, including systems analysis and design techniques; surveys hardware and software considerations; analyzes accounting applications within functional areas of the firm; and studies the control of computerized systems in a business environment. *Prerequisite:* ACCY 202 and C S 105, or equivalent. 3 hours or $\frac{3}{4}$ unit.

332. Introduction to Management Information Systems

Same as B ADM 391. Analyzes information systems from a management control perspective, emphasizing organization environment, technology, decision models and performance evaluation as determinants of information processing requirements; cases and design projects explore the management of information processing systems, major functional applications and impacts of information technology on individuals and society. *Prerequisite:* C S 105 or equivalent, or consent of instructor. 3 hours, or ½ to 1 unit.

333. Information Organization for Management Information Systems

Same as B ADM 392. See B ADM 392.

334. Management Information System Development

Same as B ADM 393. See B ADM 393.

335. Management Information and Control Systems

Same as B ADM 394. Integration of behavioral, quantitative, and system design concepts in relation to professional work in the management information systems area. *Prerequisite:* B ADM 393 or consent of instructor. 3 hours, or ½ to 1 unit.

351. Advanced Income Tax Problems

Practical and theoretical training in the more common and important provisions of the federal income tax, advanced problems, and tax case research and preparation. *Prerequisite:* Senior standing; ACCY 312. 3 hours, or ¾ or 1 unit.

401. Accounting Analysis, I

Uses of accounting information; collection, processing, and communication of accounting information; measurement of assets, liabilities, equities, and income; and accounting system design. *Prerequisite:* Enrollment in graduate degree program or consent of instructor. 1 unit.

402. Accounting Analysis, II

In-depth study of accounting valuation processes, accounting income measurement, and special reporting problems of multiple-entity organizations. *Prerequisite:* ACCY 401 or equivalent; enrollment in graduate degree program or consent of instructor. 1 unit.

403. Managerial Accounting

Introduction to management accounting as part of the firm's information system, in terms of modern cost accounting and budgetary systems for planning and controlling business operations. *Prerequisite:* Credit or concurrent registration in ACCY 401 or equivalent; enrollment in graduate degree program or consent of instructor. 1 unit.

404. Auditing

Introduction to conceptual and applied material in the field of auditing. Emphasizes the audit process, reporting, and professional responsibilities. *Prerequisite:* Credit or concurrent registration in ACCY 402, or equivalent; enrollment in graduate degree program or consent of instructor. 1 unit.

405. Federal Taxation

Introduction to historical and conceptual as well as applied material in the accounting area of federal taxation; emphasizes the provisions of the tax law relevant to accounting measurement methods. *Prerequisite:* ACCY 401; enrollment in graduate degree program or consent of instructor. 1 unit. Students may not receive credit for both ACCY 312 and 405.

411. Concepts and Principles

Fundamental structure of accounting theory developed through the study of concepts characteristic of accounting and an examination of the literature dealing with the concise formulation of accounting principles. *Prerequisite:* Enrollment in graduate accounting degree program or consent of instructor; ACCY 491. 1 unit.

417. Financial Statement Analysis

Examines tools and techniques of financial statement analysis from the perspective of investors and creditors; emphasizes theoretical and empirical properties of financial ratios. *Prerequisite:* ACCY 401, FIN 451, B ADM 472; or equivalent; and enrollment in graduate degree program or consent of instructor. 1 unit.

421. Management Accounting, I

Examines recent conceptual and analytical developments in the area of management accounting; includes a study of modern and relevant planning and control techniques and their underlying concepts as applied to the various functional areas within the firm. *Prerequisite:* Enrollment in graduate degree program or consent of instructor; an undergraduate course in management accounting. The student's background in statistics, economics, and mathematics should be equivalent to the undergraduate requirements of the University of Illinois College of Commerce and Business Administration in these areas. 1 unit.

431. The Theory of Accounting System Design

Problems and procedures in connection with designing and installing accounting systems. *Prerequisite:* Enrollment in graduate degree program or consent of instructor. 1 unit.

451. Partnership Income Taxation

Analyzes the tax treatment, problems, planning techniques, and underlying governmental policies involving partnerships and their partners, including Subchapter S corporations and their shareholders. *Prerequisite:* ACCY 312 or equivalent. 1 unit.

452. Corporate Income Taxation

Analyzes the tax treatment, problems, planning techniques, and underlying governmental policies involving corporations and their shareholders; coverage includes formations, operations, distributions, liquidations, reorganizations, and affiliations. *Prerequisite:* ACCY 351 or equivalent. 1 unit.

453. Selected Topics in Federal Taxation

Seminar on federal tax topics of current interest in specialized areas; topics include international taxation, deferred compensation, problems of closely-held businesses, estate planning, taxation of trusts, and new devel-

opments. *Prerequisite:* ACCY 351 or consent of instructor. ½ to 1 unit. May be repeated to a maximum of 2 units. Additional topics will be offered for additional credit.

456. Tax Research

Provides the student with a working knowledge of tax research methodology utilized by accountants in public practice. Aims to develop the student's capacity for either solving or defending his/her position with respect to a particular tax issue. *Prerequisite:* Graduate standing or approval. 1 unit.

459. Income Tax Development

Theoretical and historical approach to the study of the development of federal income taxation, together with some research on tax cases and critical appraisal of the current law and proposals for its revision. *Prerequisite:* Enrollment in graduate degree program or consent of instructor. 1 unit.

471. Multinational Enterprise Accounting

Analysis of accounting for operations of multinational enterprises which are subject to a wide variety of regulatory, social, and environmental influences; emphasizes financial and managerial accounting systems and their functions as evaluative, control, and reporting tools; and examines social accounting, foreign taxation, and nonmonetary evaluation methods. *Prerequisite:* Undergraduate degree in accountancy or equivalent; or ACCY 401 and consent of instructor. 1 unit.

472. Accounting Under Different Social Systems

Analyzes and compares accounting systems under different social systems with emphasis on the impact of regulatory and political structures on accounting; compares both macro and micro accounting systems for politically centralized and decentralized planning. *Prerequisite:* Undergraduate degree in accounting. 1 unit.

485. Theoretical Constructs in Accounting Research

Examines the role of information in economic and behavioral models of decision making under uncertainty; presents major paradigms underlying contemporary accounting research. Interdisciplinary approach; readings drawn from the accounting, behavioral, economics, and finance literature. *Prerequisite:* MATH 363, ACCY 491, and ECON 402. 1 unit.

491. Methods and Practices in Professional Research

Instruction in research methods, materials, and techniques together with individual practice in conducting and reporting specific professional research projects. *Prerequisite:* Enrollment in graduate accounting degree program or consent of instructor. 1 unit.

492. Accountancy Research Orientation

Comparative study of alternative methodologies and conceptual frameworks and their application to selected current research issues central to the development of accounting thought, both theoretical and empirical. *Prerequisite:* ACCY 411 and 421 and courses in behavioral science, mathematics, and economics; or equivalent background and admission

to the accountancy Ph.D. program; or consent of instructor. 1 unit.

493. Special Research Problems

Individual investigations or research projects selected by the students, subject to approval by the graduate adviser and the executive officer of the department. *Prerequisite:* Enrollment in graduate accounting degree program or consent of instructor. ¼ to 2 units.

494. Doctoral Research Seminar

Seminars in various accounting areas designed to enhance the research abilities of doctoral students and to assist them in preparing research proposals; these include Behavioral Dimensions, Public Sector, Tax, Auditing, Managerial, and others announced in the *Timetable*. *Prerequisite:* Credit or concurrent registration in ACCY 492 or consent of instructor. 1 unit. May be repeated.

495. Models of Decision and Choice

Same as PSYCH 434. See PSYCH 434.

499. Thesis Research

Individual direction and guidance in writing theses; seminar discussion of progress made. 0 to 4 units.

ADVANCED STUDY, CENTER FOR

Director: Braj B. Kachru
Department Address: 912 West Illinois Street,
Urbana
Phone: 333-6729
URL: www.cas.uiuc.edu

Center For Advanced Study (CAS)

487. Advanced Studies: Special Topics

Course is an upper-level graduate course in multidisciplinary studies with topic material that will vary semester to semester. Interested graduate students should contact the instructors. *Prerequisite:* Consent of instructor. 1 unit. May be repeated in separate semesters to a maximum of 3 units.

ADVERTISING

Head of Department: James E. Haefner
Department Office: 103 Gregory Hall, 810 South
Wright Street, Urbana
Phone: 333-1602
URL: www.comm.uiuc.edu/Advertising

Advertising (ADV)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

281. Introduction to Advertising

Survey of the economics, psychology, and philosophy of advertising; creative and media strategies; and organizational structure. This course requires limited participation as a subject in research. 3 hours. Not open to seniors unless enrolled in the College of Communications.

288. Persuasive Writing

Same as B&T W 271. See B&T W 271.

291. Special Problems

Special projects, research, and independent reading in advertising for students capable of individual work under the guidance of a faculty adviser. *Prerequisite:* Written research proposal and consent of head of department. 2 or 3 hours.

309. Public Relations

Publicity methods and public relations; representation of profit and nonprofit institutions to the public; use of communications research and media; product publicity reviewed. *Prerequisite:* Consent of department. 3 hours or ½ unit.

381. Advertising Research Methods

Overview of basic concepts of research methodology with particular emphasis on advertising research. Computer analysis and interpretation of actual data sets; measurement with both structured and unstructured techniques; principles of survey and experimental design. *Prerequisite:* ADV 281; junior standing; a specified course in statistical methods; or consent of department. 3 hours or ½ unit. No graduate credit is given to graduate majors in advertising.

382. Advertising Creative Strategy and Tactics

Theory and practice of advertising message planning and creation for print and broadcast media; development of creative platforms and competitive benefit strategies. *Prerequisite:* ADV 281; junior standing; consent of department. 3 hours or ½ unit. No graduate credit is given to graduate majors in advertising.

383. Advertising Media Planning

Analyzes the various advertising media in terms of markets served and factors to consider in the selection and evaluation of media. *Prerequisite:* ADV 281; junior standing; consent of department. 3 hours or ½ unit. No graduate credit is given to graduate majors in advertising.

390. Advanced Creative Strategy and Tactics

Planning and execution of advertising across media, with emphasis on the creation of campaigns. *Prerequisite:* ADV 382; consent of instructor. 3 hours or 1 unit.

391. Advertising Management: Planning

Application of analytical planning concepts to advertising planning and decision making;

covers all of the decision making areas of advertising. *Prerequisite:* ADV 381, 382, and 383; B ADM 202; consent of department. 3 hours or ½ unit. No graduate credit is given to graduate majors in advertising.

392. Advertising Management: Strategy and Tactics

Application of advertising management decision criteria to actual communication problems involving advertisers; development of strategy and tactics. *Prerequisite:* ADV 391. 3 hours or ½ unit. No graduate credit is given to graduate majors in advertising.

393. Advertising in Contemporary Society

Studies advertising as an institution and its role in communications, society, our economy, and business. *Prerequisite:* ADV 281; senior standing; consent of department. 3 hours or ½ unit. No graduate credit is given to graduate majors in advertising.

450. Foundations of Advertising

Evaluation of key periods, events, and individuals having significant impact on the evolution of American advertising philosophy, structure, and performance. *Prerequisite:* ADV 281, 393, and consent of instructor. 1 unit.

482. Research Methods in Advertising and Communications

Same as COMM 482. Treatment of basic research concepts and procedures in the social sciences with emphasis on advertising and communications; examines both non-quantitative and quantitative methods. *Prerequisite:* ADV 381, a basic course in statistical methods, and consent of department. 1 unit.

483. Advertising as Communication

Advertising messages from the perspective of attitude and persuasive communication theories. Application of theory to advertising communication issues. *Prerequisite:* ADV 381, or equivalent undergraduate research course; ADV 482 or an equivalent graduate research course is recommended. 1 unit.

484. Advertising and Consumer Behavior

Examines consumer behavior as a means of shaping the communications message; use of the behavioral sciences in communication strategy. *Prerequisite:* ADV 391 and consent of department. 1 unit.

485. Advertising Planning and Decision Making

Same as COMM 485. Examines the theoretical foundations of decision theory as they relate to planning and decision making in advertising; reviews concepts of strategic planning and client side operations; case studies utilized extensively. *Prerequisite:* ADV 391 and consent of department. 1 unit.

487. Graduate Seminar

Provides advertising students and faculty the opportunity to interact on current topics. *Prerequisite:* Consent of department. ½ unit. Must be repeated by master's program graduate students for a total of 1 unit.

490. Special Topics in Advertising

Prerequisite: Consent of department. 2 or 1 unit.

499. Thesis Research

Prerequisite: Graduate standing in advertising. 1 to 2 units.

AERONAUTICAL AND ASTRONAUTICAL ENGINEERING

Head of Department: Michael B. Bragg
Department Office: 306 Talbot Laboratory, 104
South Wright Street, Urbana
Phone: 333-2651
URL: www.aae.uiuc.edu

Aeronautical and Astronautical Engineering (A A E)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Principles of Aerospace Systems

Fundamental principles of aerospace systems are introduced through a systems design approach. Aeronautical engineering topics of aerodynamics, propulsion, structures and flight mechanics, and astronautical engineering topics of orbital mechanics, rockets and spacecraft systems are presented. The principles are demonstrated through design projects. *Prerequisite:* Credit or concurrent registration in A A E 204. 2 hours.

204. Introduction to Aerospace Dynamic Systems

Kinematics and dynamics of particle motion; methods of work-energy and impulse-momentum; kinematics of plane motion of rigid bodies; moving reference frames; moments of inertia. *Prerequisite:* T A M 150. 2 hours. Students may not receive credit for both A A E 204 and T A M 212.

206. Flight Mechanics

Introduction to the dynamics of aircraft and spacecraft, and to orbital mechanics; aircraft performance in various flight attitudes; aircraft stability and control; spacecraft attitude dynamics and control; the two body problem of orbital mechanics; orbit transfer. *Prerequisite:* A A E 201 and 250. 3 hours.

210. Aerodynamics I, Compressible Flow

Compressible flow aerodynamics; conservation of mass, momentum and energy; one-dimensional and quasi-one-dimensional flow; oblique shock waves and Prandtl-Meyer expansion waves; unsteady wave motion. Application to nozzles, diffusers, supersonic airfoils and shock tubes. *Prerequisite:* C S 101, MATH 285, M E 205, and credit or concurrent registration in A A E 201. 3 hours.

211. Aerodynamics II, Incompressible Flow

Equations of motion for incompressible flow, both inviscid and viscous; potential flow

theory, inviscid airfoil theory: two- and three-dimensional, Navier-Stokes equations, laminar boundary layer and transition to turbulence. *Prerequisite:* A A E 210, C S 101, MATH 280. 3 hours.

220. Aerospace Structures, I

Fundamental concepts in the linear theory of elasticity, including stress, strain, equilibrium, compatibility, material constitution and properties. Introduction to failure mechanisms and criteria. Application to plane stress/strain problems, beams in extension and bending, and shafts in torsion. *Prerequisite:* T A M 150, MATH 285. May be taken concurrently with A A E 201. 3 hours. Students receiving credit for this course will not receive elective credit for T A M 221.

221. Aerospace Structures, II

Analysis of beams and shafts of monocoque and semi-monocoque construction. Energy methods. Theory of elastic stability with applications to buckling of columns. Introduction to finite element structural analysis, with application to trusses, frames, and plane stress/strain problems. *Prerequisite:* A A E 220, MATH 280 and C S 101. 3 hours.

233. Aerospace Propulsion

Fundamentals of rocket and airbreathing jet propulsion devices; prediction of thrust, combustion reactions, specific fuel consumption, and operating performance; ramjets; turbojets; turbofans; turboprops; aerothermodynamics of inlets, combustors, and nozzles; compressors, turbines; and component matching. *Prerequisite:* A A E 210 and C S 101. 3 hours.

240. Aerospace Systems Design, I

Introduction to the design of aerospace flight systems. The principles of systems engineering, as they apply to the design process, are presented. A general design methodology is introduced. These concepts are then applied to the initial sizing of both aircraft and spacecraft systems. Involves intensive technical writing. *Prerequisite:* Credit or concurrent registration in A A E 206, 211, 221, 233, and 250. 3 hours.

241. Aerospace Systems Design, II

Conceptual design project of either an aircraft or spacecraft flight system to satisfy a given set of requirements. Project team organization. Emphasis on sizing, trade studies and design optimization, subsystem integration, and technical communication skills. *Prerequisite:* A A E 240. 3 hours.

250. Aerospace Dynamic Systems, I

Particle kinematics and dynamics; Lagrange's equations; vibration of multiple degree-of-freedom systems; rotational kinematics and dynamics of rigid bodies. *Prerequisite:* A A E 204, MATH 225 and 285. 3 hours. Students may not receive credit for both A A E 250 and T A M 312.

251. Aerospace Dynamic Systems, II

Modeling of linear dynamic systems; Laplace transform techniques; linear feedback control systems; stability criteria; design techniques. *Prerequisite:* A A E 204, and MATH 225 and 285. 3 hours.

260. Aerospace Laboratory, I

Examines theory and application of experimental techniques in aeronautical and astronautical engineering with emphasis on fluid dynamics, aerodynamics, thermal, combustion and propulsion phenomena. *Prerequisite:* A A E 211 and 233. 2 hours.

261. Aerospace Laboratory, II

Examines theory and application of experimental techniques in aeronautical and astronautical engineering with emphasis on structural mechanics, vibrations, dynamics, and systems. *Prerequisite:* A A E 221, 250, and 251. 2 hours.

270. Computational Methods in Aerospace Engineering

Introduction to numerical methods used in aerospace engineering. Finite difference method; Variational principles and Rayleigh-Ritz method; finite element method; applications from simple structural mechanics and aerodynamics problems encountered in aerospace engineering. *Prerequisite:* C S 101, A A E 210, 211, 220, and 221; or consent of instructor. 3 hours.

291. Special Problems

Special problems in the fields of aircraft or spacecraft engineering. *Prerequisite:* Consent of instructor. 1 to 3 hours. May be repeated in separate semesters.

296. Honors Project

Special project or reading course for James Scholars in engineering. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

297. Honors Seminar

Special lecture sequences and/or discussion groups arranged each semester to bring James Scholars in engineering into direct contact with the various aspects of engineering practices and philosophy. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

303. The Effect of Space Environment on Satellite Motion

Free molecule aerodynamics; gravity gradient and solar radiation torques on satellites; interaction of on-board magnetic dipoles with the earth's magnetic field; solar wind; cosmic dust and micrometeoroid torques; lifetime problem and density determination; and utilization of these various environmental effects in satellite attitude control. *Prerequisite:* A A E 211 and 206. 3 hours, or $\frac{3}{4}$ or 1 unit.

306. Orbital Mechanics

Analysis of orbits in an inverse-square gravitational field; elementary rocket dynamics, impulsive orbit transfer and rendezvous, and Lambert's Theorem with applications; patched-conic trajectories, planetary swing-by maneuvers, and linearized orbit theory with application to simplified analytical models; perturbations. *Prerequisite:* A A E 206, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

310. Computational Aerodynamics

Same as CSE 361. Introduction of computational technologies as solution tools for various aerodynamic problems; modeling and

solution of one- and two-dimensional, incompressible and compressible, steady and unsteady, inviscid external flow fields. Computational laboratory for practical experience. *Prerequisite:* A A E 211 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

311. Aerodynamics of Compressible Fluids
Methods of solution of fluid flow problems in subsonic, transonic, and supersonic flight regimes. *Prerequisite:* A A E 211. 3 hours, or $\frac{3}{4}$ or 1 unit.

313. Aerodynamics of Incompressible Fluids
Governing equations for incompressible flow; vorticity, circulation, and Kelvin's, and Helmholtz's theorems; velocity potential and stream function; three-dimensional steady and nonsteady flows, d'Alembert's paradox, and apparent mass; two-dimensional steady flows, complex potential and velocity, and mapping of flows; two-dimensional airfoils and Joukowski transformation and airfoils; and thin airfoil theory. *Prerequisite:* A A E 211 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

314. Aerodynamic Heat Transfer
Thermal boundary layers; turbulent heat transfer; aerodynamic heating; and radiative heat transfer. *Prerequisite:* A A E 211. 3 hours, or $\frac{3}{4}$ or 1 unit.

316. Applied Aerodynamics
Two-dimensional and finite wing theory with emphasis on the mechanisms of lift and drag generation; Reynolds number and Mach number effects; drag analysis; high-lift wing systems; propeller and rotor aerodynamics; control surface design; and application of V/STOL aerodynamics. *Prerequisite:* A A E 211 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

319. Aircraft Flight Mechanics
Steady and quasi-steady aircraft flight performance; take-off and landing, climbing and diving, cruise, level turn, and introduction to energy methods; longitudinal, directional, and lateral static stability and control; and introduction to longitudinal and lateral motion and dynamic stability. *Prerequisite:* A A E 206 and 251. 3 hours, or $\frac{3}{4}$ or 1 unit.

320. Finite Element Methods in Aerospace Structures
Same as CSE 353. Finite element methods in the analysis of aerospace structures; includes treatment of different types of elements in the analysis of static, dynamic, and stability problems; and emphasizes structures most commonly used in aerospace applications. Introduction to NASTRAN program use. *Prerequisite:* C S 101 or equivalent and A A E 221 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. Credit is not given for more than one of the following: A A E 320, CEE 361, and M E 345.

327. Deformation and Fracture of Polymeric Materials
Same as T A M 327. See T A M 327.

328. Mechanical Behavior of Composite Materials
Same as T A M 328. See T A M 328.

333. Electric Propulsion
Elements of propulsion as applied to deep space missions; physics of ionized gases; plasmadynamics; electrothermal, electromagnetic, and electrostatic acceleration of gases to high velocity; high-impulse thruster design and performance; and the resistojet, arcjet, ion engine, MPD arc, and plasma gun. *Prerequisite:* A A E 233. 3 hours, or $\frac{3}{4}$ or 1 unit.

334. Rocket Propulsion and Rocketry
Basic principles of rocket propulsion and rocketry, propellants and their influence on design of rockets, internal and external ballistics, combustion processes, design of components, flight performance, and rocket testing. *Prerequisite:* A A E 210 or equivalent, A A E 233. 3 hours or $\frac{3}{4}$ unit.

351. Aeroelasticity and Aeroelasticity
Advanced fundamental treatment of aerodynamic and dynamic structural phenomena associated with flexible airplanes and missiles; divergence of linear and nonlinear elastic lifting surfaces; effect of elastic and inelastic deformations on lift distributions and stability; elastic flutter of straight and swept wings; equations of disturbed motion of elastic and inelastic aircraft; dynamic response to forces, gusts, and continuous atmospheric turbulence; creep divergence of lifting surfaces; flutter in the presence of creep; and effect of temperature on inelastic divergence and flutter. *Prerequisite:* A A E 250 or T A M 311, A A E 221 or T A M 221. 3 hours, or $\frac{3}{4}$ or 1 unit.

381. Wind Power Technology
Aerodynamic, electromechanical, and structural design of wind power systems; classical windmills; modern wind power generators; wind characteristics and distribution; instrumentation and measurement; energy storage considerations; socioeconomics of wind power systems; performance of large and small scale wind turbines; and current design approaches. *Prerequisite:* A fluids course, an electrical course, and a course in mechanics, all at the 200 level or higher; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

391. Special Problems
Special problems relating to the theory, design, testing, operation, maintenance, or production of airframes or aircraft power plants. *Prerequisite:* Senior standing in engineering; consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

404. Optimization of Aerospace Systems
Formulation of parameter and functional optimization problems for dynamic systems; applications of optimization principles to the control and performance of aerospace vehicles, including optimal flight paths, trajectories, and feedback control. *Prerequisite:* A A E 250 or equivalent. 1 unit.

406. Advanced Orbital Mechanics
Circular restricted three body problem; surfaces of zero velocity, libration points, halo orbits; perturbed two body motion; Gauss and Lagrange planetary equations, Hamilton's principle, canonical equations and the Delaunay variables, application to artificial Earth satellites; orbit determination. *Prerequisite:* A A E 306 or consent of instructor. 1 unit.

408. Optimal Spacecraft Trajectories
Optimal rocket trajectories in inverse-square and linearized gravitational fields; orbital transfer, intercept, and rendezvous; high-thrust (impulsive) and low-thrust (continuous) trajectories; primer vector theory and applications; cooperative rendezvous. *Prerequisite:* credit or concurrent registration in A A E 404 or equivalent, or consent of instructor. 1 unit.

411. Transonic Aerodynamics
Fundamentals of transonic flows; transonic characteristics and flow modeling, shock wave development, properties of shock wave, transonic similarity, shock-boundary layer interactions, three-dimensional effects, transonic solution techniques, transonic design, transonic testing. *Prerequisite:* M E 305 or equivalent, or consent of instructor. 1 unit.

414. Boundary Layer Theory
Theories of the boundary layer of a compressible fluid and their solutions, laminar and turbulent; boundary layer in hypersonic flows. *Prerequisite:* A A E 314. 1 unit.

415. Wing Theory
Theoretical analysis of the aerodynamic characteristics of two- and three-dimensional wings and multiple-body systems in subsonic and supersonic flows. *Prerequisite:* A A E 313 or 316. 1 unit.

417. Fundamentals of Gas Kinetics
Fundamental concepts required to study gas dynamic problems from the viewpoint of kinetic theory; derivation of the Boltzmann equation from classical mechanics; reduced and truncated distribution functions and the BBGKY hierarchy; molecular collisions; flux vectors and equations of change; moment equations; summational invariants; H-theorem and Maxwellian distribution; inclusion of the effect of solid surfaces in kinetic theory; existence theory for the Boltzmann equation; iteration procedures; moment methods; Chapman-Enskog procedure; and first and second approximations to the distribution function, heat flux vector, and stress tensor. *Prerequisite:* M E 305 and A A E 314. 1 unit.

418. Theory of Rarefied Gas Flows
Application of kinetic theory to rarefied gas flow problems; free-molecule flow; near free-molecule flow; linearized problems; and flows with appreciable deviation from equilibrium. *Prerequisite:* A A E 417. 1 unit.

425. Advanced Composite Material Structures
Same as T A M 425. Advanced analysis of composite materials (extension of A A E/T A M 328); anisotropic elasticity; micromechanical theories; behavior of composite plates and beams under bending, buckling, and vibration; advanced elasticity solution techniques; hygrothermal behavior of polymer composites; strength prediction theories and failure mechanisms in composites; processing of metal, ceramic, and polymer composites; analysis of residual stresses. *Prerequisite:* A A E 328 or T A M 328. 1 unit.

426. Manufacturing of Advanced Polymer Matrix Composite Materials

Same as T A M and M E 426. Review of the manufacturing methods for polymer-matrix composite materials; analysis of fiber processing techniques, interfacial treatments, and composites fabrication methods; analytical treatment of process modeling including heat transfer, cure kinetics, resin flow, and residual stresses. A semester project is required. *Prerequisite:* A A E 328 or equivalent. 1 unit.

428. Theory of Large Deformations in Nonlinear Continuous Media

Fundamental concepts of large deformations in nonlinear elasticity and inelasticity with applications: generalized tensors, finite deformations, stress-strain relations in terms of strain energy functions, solutions of tension, shear and bending problems, finite plane strain, theory of successive approximations, fiber-reinforced beams, plates and cylinders, thermodynamics of deformable media, stability considerations, and constituent relations for inelasticity. *Prerequisite:* A A E 326 or equivalent. 1 unit.

429. Theory of Linear and Nonlinear Viscoelasticity

Same as T A M 429. Fundamental concepts of viscoelasticity with applications: elastic-viscoelastic analogies, creep and relaxation functions, thermomechanical reciprocity relations, variational principles, model fitting, shear center motion, thick-walled cylinders under pressure and inertia loads with material annihilation, sandwich plates, propagation of viscoelastic waves, vibration of bars, plates and shells, nonlinear elastic-viscoelastic analogy, properties of nonlinear viscoelastic stress-strain laws, creep rupture, and torsion of nonlinear bars and shells. *Prerequisite:* A A E 326 or consent of instructor. 1 unit.

438. Fundamentals of Combustion

Same as M E 403. Fundamentals of kinetic theory, transport phenomena, chemical equilibria, and reaction kinetics; flames, their gross properties, structure, and gas dynamics including oscillatory and turbulent burning; solid and liquid propellant combustion; one-dimensional detonation theory including structure and initiation; three-dimensional and other complex detonation waves; and supersonic burning. *Prerequisite:* A A E 211 or M E 305. 1 unit.

452. Stochastic Structural Dynamics

Same as T A M 417. Structural dynamics problems treated from a probabilistic point of view; theory of probability and random processes introduced as mathematical tools; response of structures under random excitation is studied in order of increasing complexity; and probability of failure for such structures is discussed. *Prerequisite:* A A E 250 or T A M 312. 1 unit.

454. Dynamical Systems and Bifurcation Theory

Fundamental concepts of nonlinear oscillations, structural stability, local and global bifurcations in the context of ordinary and partial differential equations; introduction to dynamic systems, structural stability and

Lyapunov-Schmidt Reduction, bifurcations of equilibrium points, limit cycles and tori, the center manifold and Poincaré normal forms, co-dimension two and higher order bifurcations, bifurcation theory of maps, the Birkhoff-Smale homoclinic theorem and horseshoes, Melnikov's method and Silnikov phenomena, period doubling and other routes to chaos. Applications to many engineering problems, such as aircraft at high angles of attack, pipes conveying fluid and panel flutter will be demonstrated. *Prerequisite:* A A E 250 or T A M 312. 1 unit.

490. Seminar

Presentation by graduate students, staff, and guest lecturers of current topics in the field of aeronautics and astronautics. *Prerequisite:* Graduate standing in aeronautical and astronautical engineering. 0 units.

493. Special Problems

Theoretical and experimental investigations of problems in airplane, missile, and space flight engineering. $\frac{1}{4}$ to 1 unit.

499. Thesis Research

Research in the various areas of the aeronautical and astronautical engineering sciences. 0 to 4 units.

AFRICAN LANGUAGES

(See Linguistics)

AFRICAN STUDIES

Director of Center: Paul Tiyambe Zeleza
Center Office: Room 210, International Studies Building, 910 South Fifth Street, Champaign
Phone: 333-6335
URL: www.afrst.uiuc.edu

African Studies (AFRST)**199. Undergraduate Open Seminar**

1 to 5 hours. May be repeated.

201. Elementary Bamana, I

Same as AFLNG 201. See AFLNG 201.

202. Elementary Bamana, II

Same as AFLNG 202. See AFLNG 202.

210. Introduction to Modern African Literature

Same as C LIT 210 and ENGL 211. Significant contemporary African writings depicting the history and cultural traditions of African peoples. 3 hours.

211. Elementary Lingala, I

Same as AFLNG 211. See AFLNG 211.

212. Elementary Lingala, II

Same as AFLNG 212. See AFLNG 212.

213. African Oral Literature

Same as ANTH and C LIT 213. Examines the oral literature of the African continent in all its varieties (tales, myths, songs, proverbs, etc.), in translation. Places the literature in its many contexts (historical, cultural, religious, political, legal, sociological, etc.). Explores the process of oral transmission, unique to oral literature, with particular reference to the continuity between African and Afro-American oral literature. 3 hours.

222. Introduction to Modern Africa

Same as ANTH, POL S, and SOC 222. Interdisciplinary introduction to Africa dealing with basic themes and problems in the politics, economics, sociology, anthropology, and history of Africa. 3 hours.

223. Memoirs of Africa

Same as ANTH 223. See ANTH 223.

231. Elementary Swahili, I

Same as AFLNG 231. See AFLNG 231.

232. Elementary Swahili, II

Same as AFLNG 232. See AFLNG 232.

241. Elementary Wolof, I

Same as AFLNG 241. See AFLNG 241.

242. Elementary Wolof, II

Same as AFLNG 242. See AFLNG 242.

243. Pan Africanism in the Americas, Europe, and Africa

Same as AFRO and POL S 243, and SOC 267. See POL S 243.

251. Elementary Zulu, I

Same as AFLNG 251. See AFLNG 251.

252. Elementary Zulu, II

Same as AFLNG 252. See AFLNG 252.

254. Economic Systems in Africa

Same as ACE 254. Examines systems of production and exchange in Africa. Through lectures, discussions, readings and films participants will study the ways African people interact in local markets and the impact of national and international markets on their welfare. 3 hours.

266. African Film and African Society

Same as ANTH 266. See ANTH 266.

302. Egypt Since the First World War

Same as HIST 302. See HIST 302.

303. Intermediate Bamana, I

Same as AFLNG 303. See AFLNG 303.

304. Intermediate Bamana, II

Same as AFLNG 304. See AFLNG 304.

310. Modern African Fiction

Same as C LIT and FR 310, and ENGL 370. Examines selected major African novels along thematic and formal lines; literary responses to colonialism and political independence and

the crises that accompanied both in Africa; and study of critical approaches to the African novel and African characteristics of and contribution to the novel as a genre. Readings in English. *Prerequisite:* AFRST 210 or 222, or junior standing. 3 hours or 1 unit.

313. Intermediate Lingala, I
Same as AFLNG 313. See AFLNG 313.

314. Intermediate Lingala, II
Same as AFLNG 314. See AFLNG 314.

315. Advanced Lingala, I
Same as AFLNG 315. See AFLNG 315.

316. Advanced Lingala, II
Same as AFLNG 316. See AFLNG 316.

317. Topics in Lingala Language and Literature, I
Same as AFLNG 317. See AFLNG 317.

318. Topics in Lingala Language and Literature, II
Same as AFLNG 318. See AFLNG 318.

325. Southern Africa: Race and Power
Same as HIST 325. See HIST 325.

333. Intermediate Swahili, I
Same as AFLNG 333. See AFLNG 333.

334. Intermediate Swahili, II
Same as AFLNG 334. See AFLNG 334.

335. Advanced Swahili, I
Same as AFLNG 335. See AFLNG 335.

336. Advanced Swahili, II
Same as AFLNG 336. See AFLNG 336.

337. Topics in Kiswahili Language and Literature, I
Same as AFLNG 337. See AFLNG 337.

338. Topics in Kiswahili Language and Literature, II
Same as AFLNG 338. See AFLNG 338.

339. Advanced Topics in Kiswahili Language and Literature, I
Same as AFLNG 339. See AFLNG 339.

340. Advanced Topics in Kiswahili Language and Literature, II
Same as AFLNG 340. See AFLNG 340.

343. Intermediate Wolof, I
Same as AFLNG 343. See AFLNG 343.

344. Intermediate Wolof, II
Same as AFLNG 344. See AFLNG 344.

345. Advanced Wolof, I
Same as AFLNG 345. See AFLNG 345.

346. Advanced Wolof, II
Same as AFLNG 346. See AFLNG 346.

347. Topics in Wolof Language and Literature, I
Same as AFLNG 347. See AFLNG 347.

348. Topics in Wolof Language and Literature, II
Same as AFLNG 348. See AFLNG 348.

351. Intermediate Zulu, I
Same as AFLNG 351. See AFLNG 351.

352. Intermediate Zulu, II
Same as AFLNG 352. See AFLNG 352.

450. Seminar on Selected Topics in African Studies
Topics vary with the disciplinary focus. *Prerequisite:* Consent of instructor. ½ or 1 unit. May be repeated to a maximum of 3 units.

499. Thesis Research
Individual direction in research and guidance in writing theses for advanced degrees. 0 to 2 units. May be repeated to a maximum of 2 units.

AFRO-AMERICAN STUDIES

Director of Program: Dianne M. Pinderhughes
Program Office: 1201 West Nevada Street, Urbana
Phone: 333-7781
URL: www.aasrp.uiuc.edu

Afro-American Studies (AFRO)

100. Introduction to Afro-American Studies
Interdisciplinary introduction to the basic concepts and literature in the disciplines covered by Afro-American studies; surveys the major approaches to the study of Afro-Americans across several academic disciplines including economics, education, psychology, literature, political science, sociology, and others. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

210. Race and Cultural Diversity in American Life
Same as E P S 210. See E P S 210.

224. Humanistic Perspectives of the Afro-American Experience
Presents the Afro-centric world view as it was manifested in traditional African society and in the Afro-American slave community. Shows that this world view merged with European notions of art and humanity, as revealed in modern Afro-American literature, art, and music. *Prerequisite:* AFRO 100 or consent of instructor. 3 hours.

225. Race and Ethnicity
Same as SOC 225. See SOC 225.

230. Introduction to U. S. Racial and Ethnic Politics
Same as LLS and POL S 230. See POL S 230.

231. African and Indigenous Americans of South America
Same as ANTH 231. See ANTH 231.

234. Afro-American Bibliography
Provides information and practice in the identification and use of Afro-American research materials. Emphasizes the Black experience in the United States; also the experience of Afro-Americans in the rest of the western hemisphere. 3 hours.

240. African-American Dance and American Culture
Same as DANCE 240. See DANCE 240.

243. Pan Africanism in the Americas, Europe, and Africa
Same as AFRST and POL S 243, and SOC 267. See POL S 243.

244. Social Science Perspectives in Afro-American Studies
Focuses on unique aspects of Afro-American life through a review of social science perspectives. An interdisciplinary analysis of racial inequalities will emphasize trends in white and black racial attitudes and related social psychological issues. Critically reviews traditional Black American literature and compares it with Afro-centric perspectives. *Prerequisite:* AFRO 100 or equivalent; or an introductory course in sociology, economics, anthropology, political science, or history; or consent of instructor. 3 hours.

250. Black Women: Histories and Cultures
Same as W S 250. See W S 250.

253. Afro-American History to 1877
Same as HIST 253. See HIST 253.

254. Afro-American History Since 1877
Same as HIST 254. See HIST 254.

259. Afro-American Literature, I
Same as ENGL 259. See ENGL 259.

260. Afro-American Literature, II
Same as ENGL 260. See ENGL 260.

261. Afro-American Societies and Cultures
Same as ANTH 261. Designed to examine the breadth of the black Americas in South America, Central America, the Caribbean (including Spanish, Gallic, Dutch, and English sub-areas), and Canada, with specific comparisons to rural and urban United States; the African slave trade with reference to black-white relations in the trade; the development of Creole cultures in West Africa and in Spain and subsequent cultural elaboration in the New World; conditions of slavery, slave revolts, migrations of black people in the New World; and examination of selected ethnographic material. *Prerequisite:* ANTH 102, 103, or consent of instructor. 4 hours.

271. African-American Women's History
Same as HIST and W S 271. See HIST 271.

272. Minority Images in United States Film
Same as ENGL 272. See ENGL 272.

298. Special Topics in Afro-American Studies
Advanced seminar on selected topics with particular emphasis on current research trends. *Prerequisite:* Junior status and one of the following: AFRO 224, or HIST 253 or 254,

or ENGL 259 or 260. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

300. Literature of the African Diaspora in the Americas

Critical examination of the contributions of writers of African descent from the Caribbean (English, French, Spanish) and the United States. Major works of fiction, poetry, drama and essays from Cuba, Guadeloupe, Guyana, Haiti, St. Lucia, the United States, and other countries are analyzed within a post-colonial theoretical framework. *Prerequisite:* AFRO 224 or 259 or 260 or consent of instructor. 3 hours or 1 unit.

310. Hate Crimes: Perspectives on Intergroup Aggression and Violence

Same as PSYCH 310. Hate crimes represent the manifestation of intergroup bias and aggression. Examples of these crimes will be examined while analyzing longstanding theories in social psychology. *Prerequisite:* PSYCH 201 or AFRO 244 or consent of instructor. 3 hours or ¾ unit.

314. Race and Ethnic Issues in Family Sociology and Education

Same as E P S, HDFS, and SOC 314. See E P S 314.

327. Black Political Participation in the American Political Process

Same as POL S 327. See POL S 327.

353. Development of Plantation Societies in the Americas

Same as HIST 353. Comparative and interdisciplinary approach to study of the development of New World societies with focus on plantation agriculture from the 15th to 19th centuries. Course considers Portuguese, Spanish, British, French, and Dutch colonization. Students will study the relative importance of culture versus economy and demography in determining social structure. *Prerequisite:* A survey course in early United States history and/or Western civilization; junior status, or consent of the instructor. 3 hours or 1 unit.

368. The South in American History

Same as HIST 368. See HIST 368.

379. Slavery and Race Relations in Latin America

Same as HIST 379. See HIST 379.

AGRICULTURAL COMMUNICATIONS

(See Human and Community Development)

AGRICULTURAL AND CONSUMER ECONOMICS

Head of Department: Robert J. Hauser
Department Office: 332 Mumford Hall, 1301 West Gregory Drive, Urbana
Phone: 333-1810
URL: w3.aces.uiuc.edu/ACE

Agricultural and Consumer Economics (ACE)

100. Economics of Resources, Agriculture, and Food

Principles of microeconomics; demand, production, supply, elasticity, markets, and trade are presented and used in the analysis of decisions of individuals relating to agriculturally oriented problems such as: growth and development; resources; trade; environment; and income. Macroeconomic concepts are also introduced. 4 hours. Students receiving credit for ECON 102 may not receive credit for ACE 100.

107. Agricultural, Consumer and Environmental Systems

Same as ANSCI 107. Systems approach to analyzing problem situations from a holistic perspective, emphasizing human activities and processes, is developed using classroom illustration. This approach is then applied to a case study of a current issue impacting agriculture and rural areas. There may be a field trip to an area affected by the chosen issue. 2 hours.

161. Microcomputer Applications

Studies selection and agricultural applications of microcomputer hardware and software; includes instruction and practice in solving data-related problems with microcomputers and general purpose software packages. 3 hours.

182. Consumer Issues in Textile Marketing

Multidisciplinary examination of consumer issues and fundamentals of global business, both generally and specifically as related to textile marketing. Active learning environment promoted. Consumer issues focus on consumer rights, ethics, public policy. Business fundamentals examined include textile production, distribution, marketing, management, finance and regulation. 3 hours.

183. Introduction to Fibers and Textiles

Same as NRES 183. See NRES 183.

199. Undergraduate Open Seminar and Special Topics

1 to 5 hours. May be repeated.

203. Rural Taxation

Federal, state, and local taxation with emphasis on their application to farm income, farm property, farm property transfers, and agri-

cultural cooperatives; introductory material on the uses and sources of revenue. 2 hours.

210. Economics of the Environment

Same as ECON, ENVST, NRES, and U P 210. Economic issues surrounding environmental quality, including: costs and benefits of environmental protection; economics of environmental policies; and economics of international environmental problems. *Prerequisite:* ACE 100 or ECON 102. 3 hours.

222. Marketing Commodity and Food Products

Examines factors affecting the size of the market for agricultural products and the scope of marketing activities; functions and services performed; pricing agricultural products, including the nature and causes of price fluctuations; and costs of marketing and efforts to reduce costs and improve the marketing system. *Prerequisite:* ACE 100 or ECON 102. 3 hours.

231. Food and Agribusiness Management

Provides an overview of management in the food and agribusiness sector. Major topics covered include: introduction to the food and agribusiness sector; the environment of the firm; fundamentals, structural design, and change in organizations; leadership, motivation, communication; and planning and control. Coverage is at the introductory level with a focus on textbook material and current issues. *Prerequisite:* Sophomore standing, ACE 100 or ECON 102, and ACE 161. 3 hours.

232. Management of Farm Enterprises

Economic principles applied to management of farms; budgeting; crop and livestock systems; record analysis; financial management; farm leases; and problems in resource appraisal and business reorganization. Field trip required; see *Timetable* for approximate cost. *Prerequisite:* ACE 100 or ECON 102. 3 or 4 hours. Three hours credit without home farm problem, or four hours credit with home farm problem.

233. Agribusiness Market Planning

Examines important aspects in the development of a business plan and marketing plan for a new or existing product or service in the agribusiness sector. Includes development of a complete business plan for a specific firm or segment with special attention to the organization of the firm and the markets in which the firm will operate. In addition, a marketing plan will be developed for a chosen product including: market analysis; business strategy and goals; implementation; financial analysis; monitoring and contingency planning. Computerized planning packages and presentation packages are used in the development of the final presentation. *Prerequisite:* ACE 231 or consent of instructor. 3 hours.

243. Agricultural Finance

Introduction to agricultural finance including study of financial markets and institutions providing debt and equity capital to agricultural firms, development of skills in applying principles and methods of financial management to agricultural firms. *Prerequisite:* ACE 232 or ACCY 201, or equivalent. 3 hours.

245. Personal Finance

Examines principles of personal finance with attention given to research findings on the interdependence of financial decisions and energy, time, and other resources used to attain goals and maintain values. *Prerequisite:* Sophomore standing and 3 hours of sociology, psychology, or economics. 3 hours.

251. The World Food Economy

Examines global food production, consumption, and trade; problems of hunger and population; the role of agricultural development, trade, and aid in relieving hunger. *Prerequisite:* ACE 100 or ECON 102. 3 hours.

254. Economic Systems in Africa

Same as AFRST 254. See AFRST 254.

255. Economics of Rural Poverty and Development

Examines rural poverty and rural development issues, with particular attention to current antipoverty policies and programs, and alternative policies. Topics include measurement of poverty; causes of rural poverty; socioeconomic characteristics of the rural poor; trends in rural poverty; income maintenance, education, and employment policies and their consequences; rural development strategies. *Prerequisite:* ACE 100 or ECON 102 or consent of instructor. 3 hours.

261. Statistics for Agricultural and Consumer Economics

Statistical methods applied to agricultural and consumer economics, including descriptive statistics, index numbers, statistical inference, hypothesis testing, sampling, introduction to analysis of variance, linear regression and correlation, multiple regression, time series analysis, and nonparametric methods. *Prerequisite:* MATH 124 or 125. 4 hours. Students who have received credit for ECON 172, CPSC 340, STAT 100, or equivalent may not receive credit for this course.

270. Consumer Economics

Introduction to the study of the consumer in the American economy; sources of consumer information and consumer protection; and examination of current consumer issues within an economic framework. *Prerequisite:* ACE 100 or ECON 102 or consent of instructor. 3 hours.

286. Cultural Analysis of Textiles

Cross-cultural variations in form, function, and meaning of dress analyzed in relation to physiological, psychological, and sociological needs of human beings; analysis of process of acculturation; case studies. 3 hours.

287. Textiles in the Global Economy

History of the development of fiber, fabric, apparel, and related industries; present structure, organization, domestic and international operation, and interrelationships of these industries; trends of the major sectors of the primary and secondary markets; and application of the principles of marketing to textiles and apparel. 3 hours.

288. Retail Market Analysis

Analysis of functions in a retail store with emphasis on textiles and apparel; relationship of the retailer to related primary and secondary markets and the consumer; and analysis of current trends and social influences in fashion retailing. *Prerequisite:* Concurrent registration in B ADM 202 or consent of instructor. 3 hours.

295. Internship

Supervised, off-campus experience in a field directly pertaining to a subject matter in agricultural and consumer economics. *Prerequisite:* Junior standing, cumulative GPA of 2.5 or above at the time the internship is arranged, and consent of instructor. 1 to 4 hours.

303. Agricultural Law

Relation of common-law principles and statutory law to land tenure, farm tenancy, farm labor, farm management, taxation, and other problems involving agriculture. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

306. Environmental Law

Examines environmental law issues, with particular attention to agro-environmental problems. Topics include common-law pollution control; role of administrative agencies and courts; federal and state power; air, water, and noise pollution; regulation of toxic substances; protection of land, soil, and other natural resources on agricultural land. *Prerequisite:* ACE 303, or B ADM 200 or 261, or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

310. Intermediate Natural Resource Economics

Same as ENVST 317 and NRES 310. Examines economic aspects of natural resources and their implications for public policy development; discusses economic growth, resource scarcity, property rights, stock vs. flow resources, conservation, investment decisions, discounting, and the institutional framework for decision-making; and applies the above to agricultural problems. *Prerequisite:* ACE 100 or ECON 102. 3 hours or $\frac{3}{4}$ unit.

311. Economic Analysis for Sustainable Development

Application of theory and methods of cost-benefit analysis and environmental economics to appraisal of development projects and economic programs. Topics include willingness to pay, willingness to accept, project appraisal, social benefit-cost analysis, dynamic models, ecological economics, and nonmarket valuation. *Prerequisite:* ECON 300 or equivalent. 3 hours or 1 unit.

319. Regional Environmental Management Simulation

Same as CEE, ENVST, and GEOG 341, and U P 375. See CEE 341.

320. Economics of Commodity Marketing

Examines the structure, operations, and efficiency of grain and livestock markets; product demand and linkages between grain and livestock; problems in transportation and quality standards; price discovery and market performance; role of world trade and gov-

ernment policy in markets. *Prerequisite:* ECON 102 and ACE 222. 4 hours or 1 unit.

325. Economics of Food Marketing

Same as FSHN 325. Economic performance of food system; marketing margins; transportation, processing, advertising, and retailing of food products; structure, conduct, and performance of food marketing firms and industries; government and public interest in the food system. *Prerequisite:* ACE 100 or ECON 102; ACE 222 recommended. 4 hours or 1 unit.

327. Commodity Price Analysis

Studies the factors affecting prices of agricultural products: longtime, cyclical, seasonal, and other price movements; sources of information relating to production and demand factors; government activities as they relate to prices of agricultural products; and methods and problems in price analysis and forecasting. *Prerequisite:* ACE 100 or ECON 102; ACE 261, or equivalent. 3 hours or $\frac{3}{4}$ unit.

328. Commodity Futures and Options Markets

Development of futures trading; operation and governance of commodity exchanges; economic functions of futures trading; operational procedures and problems in using futures markets; public regulation of futures trading; evaluation of market performance. Field trips required; see *Timetable* for approximate cost. *Prerequisite:* ACE 100 or ECON 102. 3 hours or $\frac{3}{4}$ unit.

331. Strategic Management in Food and Agribusiness

Same as B ADM 338. Examines the application of the strategic marketing process to the food and agribusiness sector; integrates methods and models with analysis of socioeconomic variables that affect strategic decision-making in that sector; emphasizes the dynamic nature of the decision environment in the agribusiness sector. *Prerequisite:* ACE 231, B ADM 202, or ACE 222; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

332. Decision Making in the Agricultural Firm

Analyzes decision procedures for common farm operation problems, decision-making under uncertainty, control procedures for the farm firm, evaluation of farm investments, and labor management. *Prerequisite:* ACE 232; credit or concurrent registration in ACE 243. 3 hours, or $\frac{3}{4}$ or 1 unit.

333. Practicum in Food and Agribusiness Management

Same as B ADM 339. Provides students the opportunity to develop and experiment with analytic and process skills necessary for effective decision-making in the agribusiness sector. Identification and analysis of strategic issues in the sector are emphasized. In-depth dialogue with executives-in-residence from the agribusiness sector is an integral part of the experience. *Prerequisite:* ACE 331 and consent of instructor. 4 hours or 1 unit. Course cannot be taken credit/no credit.

334. Professional Farm Management

Capstone course which examines systems of farm management as they apply to those managing farms for clients as a profession. Uses case studies to explore business practices and procedures, professional ethics, relationships with clients and farm operators and division of inputs and returns between owner and operator. A strong emphasis is placed on communication, leadership, and problem-solving skills. Marketing, leasing, and farmland as an investment will also be discussed. Field trips and comprehensive farm plan required; see *Timetable* for approximate cost. *Prerequisite:* ACE 243; credit or concurrent registration in ACE 332. 3 hours or $\frac{1}{2}$ unit.

343. Intermediate Financial Management and Markets

Examines finance principles applied to commercial agriculture at an intermediate level; farm financial and investment analysis, risk and liquidity analysis, capital structure and leasing in agriculture; and organization, structure, and analysis of rural financial markets and institutions. *Prerequisite:* ACE 243 and 261, or equivalent. 3 hours or $\frac{3}{4}$ unit.

345. Financial Planning and Counseling

Examines financial planning and counseling philosophies, techniques, and procedures with application to individuals and families in various life cycle stages and family structures. Course will use case studies, problem-solving activities, educational exhibit preparation and participation. A financial counseling clinic will focus on debt management and retirement planning. *Prerequisite:* ACE 245 and junior standing or consent of instructor; FIN 260 or 262 and 360 are recommended. 4 hours or 1 unit.

348. Rural Real Estate Appraisal

Same as NRES 348. Valuation methods and value bases of rural real estate; legal aspects of property rights, appraisal theory and procedures, condemnation appraisal, characteristics of the rural land market, soil identification and productivity, and other legal, economic, agronomic, and engineering aspects of real estate valuation. Laboratory field trips, including a practice appraisal; see *Timetable* for approximate cost. *Prerequisite:* NRES 101 and ACE 232, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

351. Economics of International Development

The economics of agricultural development and the relationships between agriculture and other sectors of the economy in developing nations; agricultural productivity and levels of living in the less developed areas of the world; and studies of agricultural development in different world regions including Africa, Asia, and Latin America. *Prerequisite:* ACE 100 or ECON 102 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

352. Economic Development in Latin America

Same as ECON 352. See ECON 352.

353. Economic Development in South and Southeast Asia

Same as ECON 353. Analysis of plans and progress toward economic development in India and southeast Asia; economic characteristics of the area and their significance for economic development. *Prerequisite:* ACE 100 or ECON 102 or consent of instructor. 3 hours, or $\frac{1}{2}$ or 1 unit.

354. Economic Development of Tropical Africa

Same as ECON 354. Types of African economies and growth of the exchange economy; development of natural resources, industry, trade, finance, and education; analysis of economic integration, governmental planning, and development projects; and demographic, land tenure, and institutional influences on development. *Prerequisite:* ACE 100 or ECON 102 or consent of instructor. 3 hours, or $\frac{1}{2}$ or 1 unit.

355. International Trade in Food and Agriculture

Examines trends and patterns of exports and imports of major agricultural commodities, and evaluates the economic and institutional factors having a bearing on this trade. *Prerequisite:* ACE 100 or ECON 102. 3 hours or $\frac{3}{4}$ unit.

356. Agricultural and Food Policies and Programs

The problems of agriculture as an industry; analysis of past and current federal and state governmental policies and programs affecting agriculture; objectives and development of policies; the use of economic concepts in evaluating possible future agricultural policies and programs; and forces in policy formation. Field trip; see *Timetable* for approximate cost. *Prerequisite:* ACE 100 or ECON 102. 3 hours, or $\frac{3}{4}$ or 1 unit.

362. Applications of Regression Models

Emphasizes the application of single-equation regression methods to problems in agricultural economics; techniques include ordinary least squares, maximum likelihood estimators, estimators with heteroskedastic, serially correlated, and multicollinear data; and uses of binary independent variables. *Prerequisite:* ACE 261 and MATH 134, or equivalents. 2 hours or $\frac{1}{2}$ unit.

363. Optimization Methods

Application of mathematical programming methods to discrete models in agricultural economics; Kuhn-Tucker theorem, Lagrange multipliers, duality, simplex method as applied to linear and quadratic programming, and input-output analysis models in agriculture. *Prerequisite:* MATH 124 and 134. 2 hours or $\frac{1}{2}$ unit.

366. Mathematics for Applied Economists

Applications of concepts of linear algebra, calculus and multivariate optimization to equilibrium analysis, comparative statics, and other topics in agricultural and consumer economics. *Prerequisite:* Graduate standing. $\frac{3}{4}$ unit. Only $\frac{1}{2}$ unit may be counted towards graduation in the Agricultural and Consumer Economics graduate programs.

370. Family Economics

Same as ECON 346. Examines the economic welfare of American families: application of economic theory to the behavior of families and individuals with respect to time allocation between the home and the market; family forms; human capital accumulation; gender differences in income; income inequality; and poverty. Considers the role of public policy. *Prerequisite:* ECON 102 or ACE 100; a course in statistics; senior standing. 3 hours, or $\frac{1}{2}$ to 1 unit.

371. Consumer Economic Policy

Analyzes choice-making, buying, using, and disposing of consumer goods by families from a social policy perspective. *Prerequisite:* Six hours of social science. 3 hours, or $\frac{3}{4}$ or 1 unit.

374. Economics of Consumption

Same as ECON 313. Introduces the concepts, theories, and methods for analysis of the micro and macro aspects of consumption; includes standards and content of consumption and description of consumption patterns and trends in the USA and selected other countries. *Prerequisite:* ECON 101, or ECON 102 and 103, or ACE 100; a course in statistics; junior standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

380. Fiber Theory and Textile Performance

Same as NRES 380. See NRES 380.

386. Marketing and Public Policy

Investigates and analyzes the external environment of textile and apparel businesses, including economic, political-legal, sociocultural, and technological forces; develops understanding of diversity of interests that business must consider through a public policy and case study approach. *Prerequisite:* B ADM 202 and ACE 287, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

387. The Consumer in the Marketplace

Analysis of the interdependent relationships between marketing stimuli and the day-to-day lives of consumers. Studies the processes involved when individuals or groups select, purchase, use, or dispose of products and services to satisfy their needs and desires. Consumer phenomena are discussed from multidisciplinary perspectives and include research and theory from consumer behavior, cultural anthropology, marketing, sociology, and psychology. *Prerequisite:* Six hours of social science course work. 3 hours, or $\frac{3}{4}$ or 1 unit.

391. Independent Study

Individual research work under the supervision of an appropriate member of the faculty. *Prerequisite:* Not open to students on probation; written consent of instructor and authorized departmental approval are required prior to enrolling. The honors section is open to James Scholars and other students having a minimum GPA of 3.0 and may be taken in conjunction with other courses in this department subject to approval of the instructor. 1 to 5 hours.

396. Practicum

Cooperatively supervised field experience in management and administration in a textile

marketing business. Only one unit may be applied to the total required for a graduate degree. At the undergraduate level, only four hours may be counted toward the hours required in Agricultural and Consumer Economics. *Prerequisite:* ACE 287 or 288 and consent of instructor. Not available to students on probation. 4 to 12 hours, or 1 to 3 units.

399. Senior Thesis

Intended primarily for candidates for honors but open to other seniors. *Prerequisite:* Senior standing; departmental approval. 3 to 5 hours.

410. Natural Resource Economics

Same as ECON, ENVST, and NRES 463. Emphasizes the role of public policy in natural resource use: theory of allocating renewable and nonrenewable natural resources over time; effects of institutions on resource use; causes and consequences of technological change; natural resources and economic growth; and applications of concepts to current natural resource issues. *Prerequisite:* ECON 300 or equivalent. 1 unit.

411. Environmental Economics: Theory and Applications

Same as ECON and ENVST 464. See ECON 464.

420. Economic Analysis of Food Commodity Markets

Examines selected economic problems in marketing agricultural products and discusses relevant theory and empirical methodologies for analyzing and interpreting research results; topics include: operational efficiency in marketing firms and industries; efficient allocation over space, form, and time; price making institutions; and research in demand stimulation and selected issues in trade. *Prerequisite:* ACE 362 and 363, and ECON 400; or equivalent. 1 unit.

427. Advanced Price Analysis

Studies the methods used to analyze factors affecting agricultural prices; analyzes agricultural prices and price movements with respect to time, space, and form; and examines methods of price forecasting and techniques of time series analysis. *Prerequisite:* ACE 362 or ECON 471, and ECON 400; or equivalent. 1 unit.

428. Research in Futures Markets

Examines the research literature on commodity futures and options markets, both theoretical and empirical; topics include: supply of storage, basis models, theory of the firm and hedging under uncertainty, optimal hedging, speculative returns, market performance, pricing efficiency and option pricing. *Prerequisite:* ACE 328 or equivalent, and ECON 400 or equivalent. 1 unit.

430. Applied Production Economics

Examines basic theory of production economics and econometric applications. Basic theory includes: duality; cost functions; profit functions; Le Chatelier principle; functional form; and aggregation. Economic applications include: nonparametric analysis; technical and allocative inefficiency; and productivity measurement. *Prerequisite:* ECON 400 and ACE 362. 1 unit.

443. Advanced Financial Management and Markets

Financial planning applied to farms and farm-related firms and sectors; financial aspects of risks and risk management in the food production/distribution system and related financial markets; and cash flow, capital budgeting, and liquidity management. *Prerequisite:* ECON 400 and calculus or mathematical statistics, consent of instructor. 1 unit.

444. Research Issues in Agricultural Finance

Examines the current research issues in agricultural finance; topics include simulation and optimization modeling and applications, economics of organization, principal agent issues, and firm-level performance evaluation. Emphasis is placed on developing a framework to evaluate research and communicate results. *Prerequisite:* ACE 362; 363; 343 or consent of instructor. ¼ unit.

451. Economic Policy in the Global Economy, I

Agricultural and food problems of the world and of selected countries viewed in the world setting; resources and institutional factors affecting production; and national and international policies and plans for developing agricultural production and improving levels of living. Emphasizes a comparative approach to agricultural development of countries on different economic levels. *Prerequisite:* ECON 400 or equivalent. 1 unit.

453. Applied Welfare and Policy Economics

Provides an intensive treatment of the theory, measurement, and interpretation of economic welfare with consideration of alternative empirical measures from both single and multiple markets. Includes coverage of various applications of welfare economics in policy analysis. *Prerequisite:* ECON 400 and at least two semesters of college calculus. 1 unit.

456. Economic Policy in the Global Economy, II

Economic theory is used to study both the effects and the causes of public policies in an international context that influence agricultural industries, consumers, and taxpayers. Neoclassical models of government intervention are used to study the welfare effects of income redistribution and stabilization policies and macroeconomic policies as they affect agriculture. Formal models of political economy and public choice are used to analyze the underlying causes of public policy. Emphasis is placed on the political power of interest groups as an explanation of public policy decisions. *Prerequisite:* ECON 400, and ACE 453 or consent of instructor. 1 unit.

460. Research Methods in Agricultural and Consumer Economics

The use of theory and observations in the formulation and resolution of research problems in agricultural and consumer economics, including criteria for choice in modeling options and observational methods. *Prerequisite:* ECON 300 or 301 and ACE 362, or equivalent. ¼ or 1 unit.

461. Applied Economic Theory for Agricultural and Consumer Economics

Provides an understanding of theory of the firm, consumer economics and various market models necessary to conduct applied economic research. Special emphasis is placed on applications relevant to agricultural and consumer economics. Course uses multivariate calculus and optimization. *Prerequisite:* ECON 300 or equivalent, and MATH 244 or ACE 366 or equivalent; or consent of instructor. 1 unit.

462. Risk and Information: Theory and Applications

Applications of the theory of economic behavior under uncertainty and asymmetric information. Analysis of individual decision making under uncertainty includes: tests of the expected utility hypothesis; comparative statistics of changes in risk preferences and risk; and moment based models of decision making. Analysis of economic equilibrium under uncertainty and asymmetric information includes tests for complete markets and applications of noncooperative game theory. *Prerequisite:* ECON 402 and 470, or STAT 310. 1 unit.

463. Advanced Math Programming in Applied Economics

Studies advanced mathematical programming methods with particular emphasis on applications in agricultural and consumer economics. Includes linear programming and extensions, nonlinear programming, sector modeling, risk modeling, and methodological issues in mathematical programming modeling of agricultural systems. *Prerequisite:* ACE 363 or equivalent. 1 unit.

464. Advanced Research and Scholarly Communication

Seminar intended for Ph.D. students who have completed written preliminary examinations. Develops a comprehensive understanding of the research process. Discussions include identification of research topics, structure of research proposals, review of literature, effective communication, management of research activities, and contributions to scholarly debate. *Prerequisite:* Consent of instructor. ½ unit.

470. Family and Consumption Economics

Discussion of current topics and review of the literature in family and consumption economics. *Prerequisite:* ECON 400 or equivalent. ½ or 1 unit.

472. Economics of the Family

Discusses and analyzes advanced literature on the economics of the family, developed within the models of human capital and allocation of time; emphasizes the theory and empirical applications. *Prerequisite:* ECON 400 or 402, ECON 470 or SOC 385, or equivalent. 1 unit.

474. Economics of Consumer Behavior

Same as ECON 413. Examines theoretical and empirical analysis of consumer demand; topics include theory of consumer behavior, as well as extensions and applications in a static context (characteristics analysis and product quality, price indices, measurement of consumer welfare) and in a dynamic

context (intertemporal choice, habit and stock adjustment modes, choice under uncertainty). *Prerequisite:* ECON 400, and ACE 362 or ECON 471. 1 unit.

481. Principles of Textile Characterization
Same as NRES 481. See NRES 481.

482. Textile Finishing: Theory and Development
Same as NRES 482. See NRES 482.

484. Topics in Consumer Marketing
Analysis of apparel marketing emphasizing trends and future research directions. *Prerequisite:* A course in marketing and consent of instructor. 1 unit.

485. High Performance Fibers
Same as NRES 485. See NRES 485.

488. Global Textile Markets: Theory and Research
Examines the history, policies, organization, performance, and trends of the international textile and apparel industries. *Prerequisite:* ACE 287 or equivalent; or consent of instructor. 1 unit.

490. Current Enrollment
0 credit.

491. Independent Study
Individual research work under the supervision of an appropriate member of the faculty. 0 to 2 units. May be repeated as topics vary to a maximum of 2 units.

492. Special Topics
Group instruction on a special topic under the direction of one or more members of the faculty. 0 to 2 units. May be repeated as topics vary to a maximum of 6 units.

494. Seminars and Workshops
Participation in a seminar or workshop with other graduate students and faculty members. 0 to 2 units.

499. Thesis Research
Individual research under supervision of members of the graduate teaching staff in their respective fields. 0 to 4 units.

AGRICULTURAL EDUCATION

(See Human and Community Development)

AGRICULTURAL ENGINEERING

Head of Department: Loren E. Bode
Department Office: 338 Agricultural Engineering Sciences Building, 1304 West Pennsylvania Avenue, Urbana
Phone: 333-3570
URL: www.age.uiuc.edu

Includes Agricultural Engineering (AG E) and Technical Systems Management (TSM)

Agricultural Engineering (AG E)

100. Introduction to Agricultural Engineering
Introduction to agricultural engineering discipline and career opportunities; class activities include familiarization with the laboratories, computer facilities, and network software available to agricultural engineering students. Classes emphasize and practice technical communication and problem-solving skills as well as career planning. 1 hour.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

221. Engineering for Agricultural and Biological Systems
Introduction to engineering methods used in the design and management of agricultural, biological and environmental systems. Topics covered include the hydrologic cycle, soil-water properties and relationships, water runoff, surveying, soil erosion, water management, engine power, fluid power, tillage, metering, cutting, conveying, and machinery management. *Prerequisite:* MATH 120, calculus and analytical geometry, or equivalent. 4 hours.

222. Engineering for Bioprocessing and Bioenvironmental Systems
Introduction to engineering analysis and design of biological processes, systems, and environments. Characterization of biological materials in engineering terms including size, shape, rheological parameters and thermal and mass transfer properties. Principles of engineering of environments for biological organisms, including psychrometrics, mass and energy balances, and environmental effects on plants and animals. *Prerequisite:* MATH 120, calculus and analytical geometry, or equivalent. 4 hours.

236. Machine Characteristics and Mechanisms
Design and development concepts of agricultural and industrial machines; analysis and synthesis of tillage, planting, harvesting, and material handling mechanisms. Includes laboratory. *Prerequisite:* AG E 221 and T A M 212. 3 hours.

277. Design of Agricultural Structures
Design of timber, concrete, and steel agricultural structures; engineering properties of wood, concrete, and steel materials; design of compression members, tension members, beams, and connections; complete design of a few structural frames. Includes laboratory. *Prerequisite:* Credit or concurrent registration in CEE 261. 3 hours.

287. Environmental Control for Plants and Animals
Application of engineering and biological principles to controlling agricultural building environments. Design of environments to meet specific biological requirements are developed through the integration of fluids and thermodynamics principles for environmental control with the properties of animals and plants and their related biological needs. Includes laboratory. *Prerequisite:* AG E 222. 3 hours.

296. Honors Project
Special problem in engineering is selected for bibliographical, theoretical, and/or experimental research. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

298. Undergraduate Seminar
Professional engineering concepts; design methods; preparation and presentation of an undergraduate design thesis proposal. Thesis to be completed in AG E 299. Field trip. *Prerequisite:* Junior standing in engineering. 1 hour.

299. Undergraduate Thesis
The agricultural engineering problem selected in AG E 298 is investigated and a detailed engineering report is prepared. *Prerequisite:* AG E 298; senior standing in engineering. 2 to 4 hours.

311. Instrumentation and Measurements
Static and dynamic measurements; design of measurement systems; error and noise control; analog and digital signal processing; telemetry; measurement of agricultural and biological quantities. *Prerequisite:* ECE 205. 3 or 4 hours, or ¾ or 1 unit. (Credit for optional lab is 1 hour or ¼ unit). Credit is not given for both AG E 311 and M E 261.

315. Applied Machine Vision
The convergence of computer imaging, pattern recognition, and artificial intelligence have made it possible to quantify complex physical phenomena that commonly occur in food and agricultural systems. This course introduces students to basic principles required for machine vision applications. Hardware and software aspects for machine vision applications will be studied. *Prerequisite:* C S 101, MATH 225, or consent of instructor. 3 hours or ¾ unit.

320. Kinematics and Dynamics of Mechanical Engineering
Same as M E 320. See M E 320.

336. Engineering Design Projects for Agricultural Industries
Open-ended, industry sponsored design projects related to agriculture which utilize principles of machine design, engineering

analysis, and functional operation of engineering systems. Projects are selected, design teams formed, concepts visualized, alternatives evaluated, and geometry created using CAD systems. Emphases on communication skills, technical writing, and interaction with industry representatives. *Prerequisite:* AG E 236, T A M 235 or CH E 371; or credit or concurrent registration in M E 271; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

340. Applied Statistical Methods

Same as ANSCI, CPSC, FSHN and NRES 340. See CPSC 340.

345. Statistical Methods

Same as ANSCI and NRES 345. See ANSCI 345.

346. Tractors and Prime Movers

Engineering aspects of design and application of tractors for farm and construction use; thermodynamics of engines; measurement of power and efficiencies; power transmission and traction; operator environment. Includes laboratory. *Prerequisite:* M E 205 or equivalent. 3 hours or $\frac{3}{4}$ unit.

356. Soil and Water Conservation Structures

Hydrology, hydraulics, design, construction and cost estimating of structures for the conservation and quality control of soil and water resources; relationship of topography, soils, crops, climate, and cultural practices in conservation and quality control of soil and water for agriculture. *Prerequisite:* Credit or concurrent registration in T A M 235. 3 hours, or $\frac{3}{4}$ or 1 unit.

357. Land Drainage

Design, construction, performance, and maintenance of surface, subsurface, and open ditch agricultural drainage systems. Includes laboratory. *Prerequisite:* Credit or concurrent registration in T A M 235. 3 hours, or $\frac{3}{4}$ or 1 unit.

360. Indoor Air Contaminant Measurement and Control

Study of particulates and gases in contaminated indoor air environments such as animal facilities, grain handling facilities, welding areas, and other industries. Effects of air quality on humans and animals. Characterization of particulates including sources, size distributions, viability, and transport properties. Properties of various gas contaminants including sources, toxic effects, and odor perception. Measurement, sampling, and control technologies for particulate and gas contaminants in indoor air environments. Course includes series of lab sessions for hands-on experience with measurement and sampling instrumentation including an aerodynamic particle sizer, a laser particle counter, a gas chromatograph/mass spectrometer, a multipoint aerosol sampler and impactors. *Prerequisite:* PHYCS 113, MATH 285, T A M 235, or equivalent. 3 hours or $\frac{3}{4}$ unit.

383. Engineering Properties of Food Materials

Physical properties of foods and biological materials; design of processing equipment and the sensing and control of food processes; thermal, electromagnetic radiation, rheological,

and other mechanical properties. Includes laboratory. *Prerequisite:* Credit or concurrent registration in T A M 221 and CH E 371; or T A M 221, T A M 235, and M E 205 or M E 213; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

385. Food and Process Engineering Design

Design of equipment, processes, and facilities for food, pharmaceutical, biotechnology, and related process industries. *Prerequisite:* AG E 383. 2 hours or $\frac{1}{2}$ unit.

387. Grain Drying and Conditioning

Psychrometric principles of air modification for dehydration and conditioning of moist products, emphasizing the drying of cereal grains; design of drying, cooling, and aeration systems. Includes laboratory. *Prerequisite:* AG E 222 or consent of instructor; M E 205 recommended. 3 hours or $\frac{3}{4}$ unit.

389. Process Design for Corn Milling

Engineering and scientific principles involved in the major corn fractionation processes of wet milling, dry milling and alkali cooking, including structural and diffusional characteristics of corn, steeping phenomena and chemical and mechanical fractionation methods. Principles of process design and mill operation. *Prerequisite:* M E 205 or 213, or CH E 371, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

396. Special Problems

Individual investigation and report of any phase of agricultural engineering approved by the department. *Prerequisite:* Senior standing in engineering. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit. May be repeated to a maximum of 16 hours or 4 units.

400. Research Orientation

Discussion of the philosophy and methods of research thesis preparation, and publication of research findings in agricultural engineering. 0 units.

490. Seminar

Presentation and discussion of current research and literature in agricultural engineering. $\frac{1}{4}$ unit.

496. Topics in Agricultural Engineering

Individual investigations or studies of any phases of agricultural engineering selected by the student and approved by the adviser and the faculty member who will supervise the study. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated to a maximum of 4 units.

499. Thesis Research

0 to 4 units. May be repeated.

Technical Systems Management (TSM)

100. Technical Systems in Agriculture

Examples, problems, discussions, and laboratory exercises pointing to present and potential engineering applications in agriculture; emphasis on farm power and machinery, soil and water control, farm electrification, and farm structures. Includes laboratory. *Prerequisite:* MATH 112, 114, or 116, or equivalent. 3 hours.

111. Humanity in the Food Web

The human food web is the complex network of technologies, environments, people, and social institutions that produces, processes, and distributes the world's food supply. Students will study the food webs of the past, present, and future and will explore various human roles, including their own, in the global technology-environment-society-food system. Course topics include domestication, mechanization, urbanization, the green revolution, biotechnology, food safety, the environment, and appropriate technologies for developing countries. A case study of the development of Chicago and the simultaneous conversion of the tall grass prairie to the Corn Belt will be conducted. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Materials and Construction Systems

Selection, use, and maintenance of hand and power tools; shop safety; selection of building and roofing materials; concrete masonry construction; farm surveying. Includes laboratory. Priority is given to students in agricultural occupations and technical systems management majors. *Prerequisite:* Junior standing and consent of instructor. 3 hours.

202. Metallurgy, Materials, and Welding Processes

Selecting and using metal-arc, inert-gas, submerged arc, oxyacetylene welding and cutting processes for construction and maintenance of agricultural equipment. Includes laboratory. See *Timetable* for materials charge. *Prerequisite:* CHEM 101; junior standing or consent of instructor. 3 hours.

203. Electric Wiring, Motors, and Controls Systems

Selecting and using wiring materials, electric motors and controls in agricultural lighting, heating, ventilation, and materials handling problems. Includes laboratory. See *Timetable* for materials charge. *Prerequisite:* PHYCS 140 or TSM 100; junior standing or consent of instructor. 3 hours.

221. Power and Machinery Management

Performance, costs, application, selection, and replacement of farm tractors and field implements; optimization of mechanized agricultural field operations. Includes laboratory. *Prerequisite:* TSM 100. 4 hours.

240. Fluid Power Technology

Fundamentals of fluid power technology from the perspective of industrial and offroad equipment applications. Students will be introduced to the basic requirements of fluid power circuit analysis, functional elements of fluid power systems, and practical circuits through a combination of classroom and laboratory exercises. 2 hours. Students may not receive credit for both TSM 240 and AG E 221.

250. Technical Systems Management Internship

Supervised off-campus learning experience with a business firm engaged in production or technological service to agriculture. *Prerequisite:* Junior standing with a 2.0 cumulative

grade point average; TSM 221, 252, 272, or 281; and consent of the coordinator of program. 2 hours.

252. Soil and Water Management Systems
Principles of planning, constructing, and adapting soil conservation and drainage practices for Illinois farms, and the application of surveying to these practices. Includes laboratory. *Prerequisite:* TSM 100 or 200. 3 hours.

271. Residential Housing Design
Study of principles and practices in residential housing; space planning, house types, structures, materials, utilities, environmental control, energy conservation, remodeling, and economic influences. *Prerequisite:* TSM 100, or consent of instructor. 3 hours.

272. Structural and Environmental Systems
Planning principles for agricultural storage buildings and animal housing; building space planning, structural designs, ventilating systems, construction materials, costs, and livestock waste systems; includes laboratory. *Prerequisite:* TSM 100 or 200, or consent of instructor. 3 hours.

281. Grain Drying, Handling, and Storage Systems
Grain drying fundamentals, air-moisture relationships, grain drying systems for efficient energy use, fans, grain-handling devices and systems, planning of grain handling systems, grain standards, moisture measurement, grain storage, fungi and insect problems, aeration, processing and milling of corn and soybeans. Includes laboratory. *Prerequisite:* Junior standing. 3 hours.

299. Professional Seminar
Role of the mechanization of agriculture in society and the part of the individual graduate in this role; directed toward the study of the interplay of developments in agriculture and technical systems management; topics selected from technical and popular journals. A tour of farms, industry, and business is required. *Prerequisite:* Junior standing. 1 hour.

300. Special Problems
Technical agricultural problem is selected for study, investigation, and report, wherein a satisfactory solution does not require a background of engineering education. *Prerequisite:* Minimum GPA of 2.5; consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

333. Chemical Applications Systems
Hydraulic principles; liquid application systems including pumps, controls, and agricultural spray nozzles; granular application systems; safe storage, handling, and disposal of pesticides and fertilizers; federal and state legal requirements. Includes laboratory. *Prerequisite:* TSM 221; CPSC 326; or PL PA 377; or ENTOM 319. 3 hours or $\frac{3}{4}$ unit.

341. Engine and Tractor Power
Construction, performance and maintenance of internal combustion engines, power trains, and hydraulic systems for powered equipment; methods and equipment for performance testing. Includes a laboratory. *Prerequisite:* TSM 221 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

381. Electrical and Microcomputer Control Systems

Microcomputer and electrical control applications; electrical fundamentals; solid-state devices; relays; sensors; motor types and characteristics; three-phase power; logic devices; analog/digital convertors; single-board microprocessors and interfacing for agricultural control applications. Includes laboratory. *Prerequisite:* TSM 100; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

AGRICULTURAL, CONSUMER AND ENVIRONMENTAL SCIENCES

Program Administrator: R. Kirby Barrick
Program Office: 104 Mumford Hall, 1301 West Gregory Avenue, Urbana
Phone: 333-3380
URL: www.aces.uiuc.edu/Acad-Proj/

Agricultural, Consumer and Environmental Sciences (ACES)

100. Contemporary Issues in Agricultural, Consumer and Environmental Sciences
Study of contemporary issues in the human, food and natural resource systems, and an overview of the role of the College of Agricultural Consumer and Environmental Sciences and the University of Illinois in this system. Required of and limited to freshmen enrolled in the Agricultural, Consumer and Environmental Sciences College. 2 hours.

199. Undergraduate Open Seminar
0 to 5 hours. May be repeated. Approved for S/U grading.

298. International Experience
International experience in agricultural, consumer and environmental sciences related areas involving foreign travel and study without enrollment in another institution. Experience must be planned and approved in advance through consultation with a College of Agricultural, Consumer and Environmental Sciences faculty member. *Prerequisite:* Written consent of instructor; junior standing; not open to students on probation. 1 to 4 hours.

299. Agricultural, Consumer and Environmental Sciences Study Abroad
Provides campus credit for study at accredited foreign institutions. Final determination of credit granted is made upon the student's successful completion of work. *Prerequisite:* Consent of major department, college, and Study Abroad Office. 0 to 15 hours (summer session, 0 to 8 hours). May be repeated to a maximum of 36 hours within one calendar year.

AIR FORCE AEROSPACE STUDIES

Head of Department: Stephen Wanzek
Department Office: 223 Armory Building, 505 East Armory Avenue, Champaign
Phone: 333-1927

Note: Students considering enrollment in Military Science, Naval Science, or Air Force Aerospace Studies courses should be aware that University policy prohibits discrimination on the basis of sexual orientation; students may enroll in these courses regardless of sexual orientation. Students seeking to enroll in ROTC are not asked to disclose their sexual orientation. However, homosexual conduct is grounds for disenrollment from the program.

Air Force Aerospace Studies (AFAS)

102. Leadership Laboratory
Aerospace Studies Leadership Laboratory (LLAB) is a co-requisite with all Air Force Aerospace Studies courses. LLAB is the application of personal leadership skills, demonstration of command, effective communication, individual leadership instruction, physical fitness training, and knowledge of U. S. Air Force customs and courtesies. *Prerequisite:* Consent of instructor. 0 hours.

111. The Air Force Today, I
Survey course focusing on the organizational structure and missions of Air Force organizations, military customs and courtesies, officership and core values, and an introduction to written and oral communication skills. 1 hour. Requires concurrent enrollment with AFAS 102.

112. The Air Force Today, II
Continuation of AFAS 111. Survey course focusing on the organizational structure and missions of Air Force organizations, military customs and courtesies, officership and core values, and an introduction to written and oral communication skills. *Prerequisite:* AFAS 111 or consent of instructor. 1 hour. Requires concurrent enrollment with AFAS 102.

121. The Development of Air Power, I
Historical survey of trends, events, and policies that led to the emergence of air power through the Persian Gulf War. Also provides an introduction to basic leadership and management skills, ethical decision making, and basic communication skills. *Prerequisite:* AFAS 112 or consent of instructor. 1 hour. Requires concurrent enrollment with AFAS 102.

122. The Development of Air Power, II
Continuation of AFAS 121. Historical survey of trends, events, and policies that led to the emergence of air power through the Persian Gulf War. Also provides an introduction to basic leadership and management skills, ethi-

cal decision making, and basic communication skills. *Prerequisite:* AFAS 121 or consent of instructor. 1 hour. Requires concurrent enrollment with AFAS 102.

231. Air Force Leadership and Management, I

Study of leadership and quality management fundamentals, professional knowledge, leadership ethics, and communication skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts. *Prerequisite:* AFAS 122 or consent of instructor. 3 hours. Requires concurrent enrollment with AFAS 102.

232. Air Force Leadership and Management, II

Continuation of AFAS 231. Study of leadership and quality management fundamentals, professional knowledge, leadership ethics, and communication skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership and management situations as a means of demonstrating and exercising practical application of the concepts. *Prerequisite:* AFAS 231 or consent of instructor. 3 hours. Requires concurrent enrollment with AFAS 102.

241. National Security Forces in Contemporary American Society, I

Study of the Armed Forces as an integral element in contemporary society with specific emphasis on the military profession, civil-military interaction, and the formulation, organization, and implementation of U. S. national security policy. In addition, students study leadership and management, ethical decision making, and communication skills. *Prerequisite:* AFAS 232 or consent of instructor. 3 hours. Requires concurrent enrollment with AFAS 102.

242. National Security Forces in Contemporary American Society, II

Continuation of AFAS 241. Study of the Armed Forces as an integral element in contemporary society with specific emphasis on the military profession, civil-military interaction, and the formulation, organization, and implementation of U. S. national security policy. In addition, students study leadership and management, ethical decision making, and communication skills. *Prerequisite:* AFAS 241 or consent of instructor. 3 hours. Requires concurrent enrollment with AFAS 102.

Animal Sciences (ANSCI)

100. Introduction to Animal Sciences

Survey of beef and dairy cattle, companion animals, horses, poultry, sheep, and swine. Includes the importance of product technology and the basic principles of nutrition, genetics, physiology, and behavior as they apply to breeding, selection, feeding, and management. Lecture and lab. 4 hours. Credit is given only for freshmen, sophomores, and first-semester transfer students.

103. Domestic Animals in Their Environment

Introductory course that will provide novice students with the fundamentals of animal-animal and animal-human interactions for domestic farm animals. Emphasizes hands-on experiences to develop a background in the concepts and practice of recognizing and understanding the animal's physiology and behavior, animal well being, and animal responses to human interactions. *Prerequisite:* ANSCI 100 or consent of instructor. 2 hours.

107. Agricultural, Consumer and Environmental Systems

Same as ACE 107. See ACE 107.

109. Meat Purchasing and Preparation

General approach to meat utilization with emphasis on selecting, grading, cutting, and pricing meat for the home, restaurant, and food service industry; includes laboratory. When appropriate, field trips are taken to area commercial establishments; see *Timetable* for approximate cost. 2 hours.

110. Living with Animals and Biotechnology

Lecture/discussion course that will provide freshman students an overview of biotechnology and animals. Focuses on significant technological achievements involving animals and how they influence the global development of agriculture, medicine, and industry. *Prerequisite:* Freshman standing, nonanimal sciences majors. 2 hours.

119. Meat Technology

Student participation in the transformation of live animals through slaughter and carcass fabrication into food products for human consumption; includes laboratory. Purchase of personal equipment is required; see *Timetable* for approximate cost. *Prerequisite:* Consent of instructor. 3 hours.

150. World Animal Resources

Examination of the world's animals, domesticated and wild, and their uses in various climatic, economic and cultural contexts. Exploration of their contemporary management and their future prospects. Provides background for international experiences, such as ACES 298 and 299. *Prerequisite:* Completion of the campus Composition I general education requirement. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Special Problems

Individual research in animal sciences. *Prerequisite:* Minimum GPA of 2.5; not open to students on probation; consent of instructor and head of department. The honors section is open to James Scholars and other students having a minimum GPA of 3.0 and may be taken in conjunction with other courses in this department subject to approval of the instructor. 1 to 5 hours.

201. Principles of Dairy Production

Surveys the dairy industry; examines principles of breeding, selection, reproduction, feeding, milking, and management of dairy cattle. *Prerequisite:* ANSCI 100. 3 hours.

202. Domestic Animal Physiology

Study of the basic physiology of domestic animals in relation to husbandry practices. *Prerequisite:* ANSCI 100 or one semester of animal biology, or equivalent. 4 hours.

203. Behavior of Domestic Animals

Same as EEE 203. Introduction to concepts of animal behavior with emphasis on domestic animals; lecture and lab. *Prerequisite:* BIOL 104 and ANSCI 100, or equivalent. 3 hours. Credit is not given for both ANSCI 203 and EEE 346.

204. Introduction to Dairy Cattle Evaluation

Evaluation of physical traits of dairy cattle in relation to economic value and genetic improvement; sire selection, mating systems, and genetic merit for dairy cattle. Field trip required. See *Timetable* for approximate cost of field trip. *Prerequisite:* ANSCI 100 or consent of instructor. 2 hours.

205. Human-Companion Animal Interactions

Explores the relationships between humans and companion animals and the roles and functions that animals play in today's society. Examines the evolution of the human/companion animal bond, benefits and disadvantages of this bond, and working/nonworking roles of companion animals. Controversial issues which are of current concern to society will be examined in detail. *Prerequisite:* Sophomore standing. 3 hours.

206. Horse Management

Focus on the principles of managing horses from birth through breeding; topics include reproductive physiology, breeding management, nutrition, diseases, parasites, herd health programs, genetics, facility design and exercise physiology. *Prerequisite:* ANSCI 220, 231, and credit or concurrent registration in ANSCI 221. 3 hours.

207. Companion Animal Management

Biological management of companion animals emphasizing the dog and cat as well as others such as the rabbit, the bird, and fish; subject matter includes anatomy, breeds and breed types, selection, nutrition, reproduction, genetics, training, health and disease, equipment needs, and showing of small animals. 3 hours.

209. Meat Animal and Carcass Evaluation

Principles and techniques of meat animal and carcass evaluation and their relationship to current practices in industry; includes dem-

ANIMAL SCIENCES

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onstrations and student participation. Students planning to enroll in ANSCI 210 and 212 should take ANSCI 209 in their sophomore year. *Prerequisite:* ANSCI 100. 3 hours.

210. Meat Selection and Classification

Characteristics associated with the value of carcasses and wholesale cuts from meat animals; grading and classification. Field trips to meat packing plants are required; see *Timetable* for approximate cost. *Prerequisite:* ANSCI 209. 2 hours.

211. Breeding Animal Evaluation

Application of current scientific tools, methods, and performance programs available to livestock breeders for improving beef cattle, swine, sheep, and horses; emphasis on the changing nature of modern breeds of livestock as influenced by selection, economics, and consumer and market trends. *Prerequisite:* Sophomore standing; credit or concurrent registration in ANSCI 209 required for the food animal section only. 3 hours.

212. Advanced Livestock Evaluation

Advanced instruction in the selection of breeding animals of beef, sheep, and swine species and in the evaluation of market animals for slaughter. This course requires visits to farms, related companies, and events to observe the latest techniques and scientific principles associated with livestock selection and evaluation. *Prerequisite:* ANSCI 211 or consent of instructor. 3 hours.

213. Horse Appraisal

Advanced course for students interested in improving their performance and conformation evaluation skills; provides exposure to the horse show industry and the career opportunities associated with this facet of the horse industry; students may compete in intercollegiate judging contests. *Prerequisite:* ANSCI 211. 1 hour. May be repeated to a maximum of 2 hours.

214. Advanced Dairy Cattle Evaluation

Advanced instruction in the selection of breeding dairy animals. Involves visits to farms, related companies and events to observe the latest techniques and scientific principles associated with dairy cattle selection and evaluation. Field trips for cattle judging are required. *Prerequisite:* ANSCI 204 or consent of instructor. 2 hours. May be repeated to a maximum of 4 hours.

220. Plant and Animal Genetics

Same as CPSC and NRES 220. See CPSC 220.

221. Animal Nutrition

Principles of animal nutrition and their application to farm livestock and man. *Prerequisite:* CHEM 102 or equivalent. 4 hours. Credit is not given for both ANSCI 221 and 325.

231. Biology of Reproduction

Same as BIOL 231. Study of the basic principles of reproduction, lactation, growth, and hormone regulation of domestic and nondomestic animals as well as humans, including biotechnological methods of reproductive control, manipulation, performance enhancement of lactation and growth, and disease control. *Prerequisite:* Sophomore standing;

BIOL 104 or one introductory level biology course. 4 hours.

247. An Introduction to Gross Anatomy

Same as V B 200. See V B 200.

250. Animal Sciences Internship

Supervised off-campus learning experience in an animal-related enterprise. *Prerequisite:* Junior standing in animal sciences or agricultural sciences with animal sciences emphasis; good academic standing; consent of department head; ANSCI 100 and a 200-level course in animal sciences. 2 to 4 hours.

283. Beef Cattle and Swine Management

Examines basic principles of beef cattle and swine management for students other than animal sciences majors. *Prerequisite:* ANSCI 100. 3 hours. Credit is not given for both ANSCI 283 and ANSCI 301 or 303.

290. Introduction to Metabolism in Domestic Animals

Principles and regulation of metabolism in animals, emphasizing energy derivation and its relationship to domestic animal production. *Prerequisite:* CHEM 102 and credit or concurrent registration in ANSCI 221. 3 hours.

295. Senior Honors Thesis

Independent study, under the supervision of a faculty member, on a problem of appropriate scope and character that culminates in writing a thesis. Intended primarily for honors students who plan on conducting research and/or pursuing graduate study. Thesis projects must be supervised by a faculty member and reviewed by a departmental committee. Students must present a satisfactory thesis to receive credit. *Prerequisite:* Senior standing; minimum GPA of 3.4; consent of a faculty member. 5 hours.

298. Undergraduate Seminar

Presentations and discussion of employment opportunities, departmental research activities, and topics relevant to animal agriculture. *Prerequisite:* Sophomore standing. 1 hour.

299. Animal Management Field Studies

Field studies of farms and service industries; discusses and demonstrates management practices on commercial farms. Trip normally taken during spring break; see *Timetable* for approximate cost. *Prerequisite:* Credit or concurrent registration in ANSCI 100. 1 hour. May be repeated to a maximum of 4 hours.

300. Dairy Herd Management

The technology of modern milk production practices; application of principles in nutrition, physiology, economics, health and hygiene, waste management, and facilities design for efficient dairy herd management systems. See *Timetable* for approximate cost of field trip. Appropriate for students in veterinary medicine interested in large animal practice. *Prerequisite:* ANSCI 221 or equivalent. 3 hours or $\frac{3}{4}$ unit.

301. Beef Production

The principles of feeding and management of beef cattle; financial aspects of beef production; and diseases, parasites, and breeding difficulties of beef cattle. Lectures, demonstra-

tions, and discussions. *Prerequisite:* ANSCI 221 or equivalent. 3 hours or $\frac{3}{4}$ unit.

302. Sheep Production

Study of management, nutrition, reproduction, genetics, marketing, economics, housing, health and production record programs as they apply to sheep production. History of the U. S. sheep industry will be explored along with a study of wool production, marketing and processing. *Prerequisite:* ANSCI 221 or equivalent. 3 hours.

303. Pork Production

Applies science and technology to the selection, breeding, feeding, housing and management of swine in a production enterprise; emphasizes use of research findings in decision making. *Prerequisite:* ANSCI 220, 221, and 307; and ANSCI 231 or 331. 3 hours or $\frac{3}{4}$ unit. Credit is not given for both ANSCI 283 and 303.

304. Poultry Science

Basic principles of genetics, physiology, nutrition, and health of avian species; the application of science and technology in solving the breeding, nutrition, disease, housing, and other management problems encountered in commercial egg and poultry meat production. *Prerequisite:* ANSCI 221 or 325, or consent of instructor. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit. Undergraduate and graduate students must complete research project to obtain 4 hours or 1 unit credit.

305. Genetics and Animal Improvement

Principles of heredity and their application to the problems of animal improvement. *Prerequisite:* CPSC 220 or equivalent. 3 hours or $\frac{3}{4}$ unit.

306. Equine Science

Understand and apply current scientific research and principles of equine science to intensive horse production. An in-depth approach to equine reproductive physiology, nutrition, anatomy, and exercise physiology will be followed using a combined lecture and laboratory format. Emphasis on current research and hands-on techniques. *Prerequisite:* ANSCI 202, 206, and 231, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

307. Environmental Aspects of Animal Management

Animal-environmental interactions (including thermal, air, microbic, photic, sound, and behavioral factors) as bases for prescribing practical environments for production of animals. *Prerequisite:* ANSCI 202. Courses in physiology, nutrition, microbiology, and genetics, respectively, are recommended. 3 hours or $\frac{3}{4}$ unit.

308. Lactation Biology

Examines anatomy, development, physiology and cell biology of the mammary gland; the endocrine, biochemical and environmental control of milk synthesis, secretion and composition; and comparative lactation biology. *Prerequisite:* ANSCI 231 or consent of instructor. 4 hours or 1 unit.

309. Meat Science

Fundamental biological principles that influence growth, composition, processing, preservation, and quality of meat and meat

products. *Prerequisite:* CHEM 102; MCBIO 100 and 101, or 200 and 201. 4 hours or 1 unit.

310. Immunogenetics and Immunophysiology

Same as BIOL and VP 310. Blood groups, genetics of immunoglobulins, the T-cell receptor, immunoevolution, lymphocyte differentiation, the major histocompatibility complex, disease resistance, immune-endocrine interactions, and involvement of the immune system in fertility, nutrition, and aging. *Prerequisite:* BIOL 210 and 307 and ANSCI 202. 4 hours or 1 unit.

312. Animal Growth and Development

Basic principles of animal growth from early fetal development through typical marketing ages for the major domestic animal species. Topics discussed include molecular and cellular determinants of tissue development and whole animal growth, with coverage of current and future technologies for manipulating growth to enhance animal production. *Prerequisite:* ANSCI 202 and 221; ANSCI 290 or BIOCH 350; or consent of instructor. 3 or 4 hours, or 1 unit.

316. Population Genetics

Same as BIOL 316. Mathematical theory of the genetics of populations: estimation of allele frequency for autosomal and X-chromosomal loci, Hardy-Weinberg principle, systems of mating, relationship between relatives, forces that change allele frequency, and quantitative inheritance. Applications to animals, plants, and humans. *Prerequisite:* ANSCI 220, BIOL 120, or BIOL 210, and MATH 120 or 134; or consent of instructor. 3 or 4 hours or $\frac{3}{4}$ or 1 unit. Students desiring 4 hours or 1 unit credit do additional work in some area of population genetics.

317. Quantitative Genetics

Same as BIOL 317. Mathematical theory of the genetics of quantitative traits: properties of random-mating populations; estimation of repeatability, heritability, and genetic correlation; genetic results of selection; selection methods; correlated response; and selection for more than one trait. Application to animals and plants. Students desiring 4 hours or 1 unit credit do additional work in some area of quantitative genetics. *Prerequisite:* ANSCI 316; and credit or concurrent registration in ANSCI 345, or CPSC 440; or consent of instructor. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit.

320. Nutrition and Digestive Physiology of Ruminants

Physiology and microbiology of digestion in the ruminant, and biochemical pathways of utilization of the absorbed nutrients for productive purposes. *Prerequisite:* ANSCI 221. 3 hours or $\frac{3}{4}$ unit.

321. Minerals and Vitamins in Metabolism

Nutritional implications and metabolic roles of minerals and vitamins in animal metabolism. The course is designed to instill a basic understanding of vitamin and mineral functions, absorption, metabolism, and excretion. Research methodologies used in the study of vitamin and mineral nutrition will also be discussed. *Prerequisite:* A course in nutrition (ANSCI 221, 325, Foods and Nutrition 324, or

equivalent) and credit or concurrent registration in BIOCH 350 or ANSCI 290, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

322. Companion Animal Nutrition

Digestive physiology and basic nutritional considerations of companion animals including canine, feline, laboratory animals, and some wildlife species. Nutritional idiosyncrasies and the importance of nutrition in various physiological states will be emphasized. Current research findings will be used to illustrate development/refinement of nutritional principles applied to these species. *Prerequisite:* ANSCI 221 or equivalent. Previous course in physiology (ANSCI 202), organic chemistry (CHEM 231), and biochemistry/intermediary metabolism (ANSCI 290 or BIOCH 350) will be advantageous but are not required. 3 hours or $\frac{3}{4}$ units.

325. Principles of Animal Nutrition

Principles of animal nutrition and their application to veterinary practice; designed primarily for students in veterinary medicine. Lecture and laboratory. *Prerequisite:* BIOCH 350, or equivalent. 3 hours or $\frac{3}{4}$ unit. Credit is not given for both ANSCI 325 and 221.

331. Physiology of Reproduction in Domestic Animals

Examines anatomy and physiology of reproduction and application to animal production; discusses topics that include endocrinology, ovarian and testicular function, estrous cycles, fertilization, implantation, pregnancy, and environmental and management factors influencing reproduction. *Prerequisite:* ANSCI 231 or equivalent. 3 hours or $\frac{3}{4}$ unit.

340. Applied Statistical Methods

Same as AG E, CPSC, FSHN, and NRES 340. See CPSC 340.

341. Human Evolution, II

Same as ANTH 341. See ANTH 341.

345. Statistical Methods

Same as AG E and NRES 345. Design and analysis of experiments: multiple regression, method of fitting constants, factorial experiments with unequal subclass numbers, analysis of covariance, experimental design; computer applications to agricultural experiments using statistical packages. *Prerequisite:* CPSC 340, or MATH 263, or equivalent. 4 hours or 1 unit.

346. Animal Behavior

Same as ANTH, BIOL, and EEE 346. See EEE 346.

355. Principles of Laboratory Animal Sciences, I

Same as VP 346 and BIOL 355. See VP 346.

356. Principles of Laboratory Animal Sciences, II

Same as VP and BIOL 356. See VP 356.

358. Mathematical Modeling in Life Sciences

Same as BIOL and STAT 358. Introduction to deterministic and stochastic mathematical models for the life sciences, statistical methods for fitting and testing models, and com-

puter simulation programs. Applications to populations, processes, and products of animals, plants, and humans. *Prerequisite:* BIOL 104 and PLBIO 100, or BIOL 121; a course in calculus, and a course in computer sciences; or consent of instructor. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit. Students desiring 4 hours or 1 unit credit do additional work in some area of mathematical modeling in the life sciences.

368. Biological Modeling

Same as CPSC, BIOL, and GEOG 368. See GEOG 368.

385. Gastrointestinal and Methanogenic Microbial Fermentations

Fundamental aspects of the ecology of microorganisms and their biochemical activities related to the anaerobic degradation of organic matter; emphasizes anaerobic ecosystems of the mammalian gastrointestinal tract and methanogenic organic residue fermentations (animal wastes, sediments). *Prerequisite:* BIOCH 350 or BIOCH 352 and 353, and MCBIO 100; or MCBIO 200 or 309, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

401. Animal Bionomics

Discussion of the current literature and research techniques pertaining to adaptation of domestic animals to their environments. *Prerequisite:* ANSCI 307 or consent of instructor. $\frac{1}{2}$ unit.

402. The Microbiology and Physiology of Ruminant Nutrition

Physiological and microbiological aspects of ruminant digestion and their influence on the metabolism of the extraruminal tissues; interpretation of nutritive requirements in terms of rumen microbial activities; and evaluation of research techniques. *Prerequisite:* BIOCH 350 or equivalent. $\frac{3}{4}$ unit. Offered in alternate years.

403. Techniques in Animal Nutrition Research

Discusses and applies methods of laboratory analysis and animal experimentation frequently used in nutrition research. *Prerequisite:* Courses in nutrition, physiology, and biochemistry and consent of instructor. $\frac{3}{4}$ unit.

404. Concepts in Nonruminant Nutrition

Review of current literature in nonruminant nutrition. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ unit.

409. Muscle Biology

Microstructure and chemical composition of muscle tissue; chemistry and biosynthesis of muscle and connective tissue proteins; and biochemical aspects of muscle contraction and rigor mortis. *Prerequisite:* BIOCH 350 and 355. $\frac{1}{2}$ unit.

410. Current Topics in Nutritional Research

Same as FSHN and NUTRS 410. See NUTRS 410.

411. Comparative Regulation of Macronutrient Metabolism

Same as NUTRS and FSHN 411. See NUTRS 411.

412. Advanced Endocrinology

Same as PHYSL and V B 412. See PHYSL 412.

417. Advanced Quantitative Genetics

Same as BIOL 417. Advanced theory of the genetics of quantitative traits; lectures, student presentations, and discussions on selected readings; and application to biological systems. *Prerequisite:* ANSCI 317 or CPSC 444; or consent of instructor. 1 unit. Offered in alternate years.

420. Comparative Protein and Energy Nutrition

Physiological aspects of protein and amino acids, fats and fatty acids, and carbohydrates as applied to higher animals; includes classification, digestion, absorption, utilization, metabolism, and dietary deficiencies and excesses. *Prerequisite:* BIOCH 350 or equivalent and a course in nutrition. ¾ unit.

431. Advanced Reproductive Endocrinology

Same as PHYSL and V B 431. The reproductive endocrinology of domestic and laboratory animals. Topics include neuroendocrinology; chemistry, metabolism, and action of hormones; regulation of gonadal function; endocrine changes during puberty, aging, pregnancy, and parturition; external factors affecting reproduction; infertility; and hormones and behavior. *Prerequisite:* ANSCI 331, PHYSL 312, BIOCH 350, or equivalent. ¾ unit.

432. Advanced Reproductive Physiology

Comparative physiology of production of domestic and laboratory animals, including gametogenesis, fertilization, embryonic development, and factors influencing reproduction. *Prerequisite:* ANSCI 331 and BIOCH 350; or equivalent. ¾ unit.

433. Laboratory Methods in Reproductive Physiology

Same as PHYSL and V B 433. Laboratory methods used in reproductive physiology studies, such as blood sampling, large animal surgery, collection of tissues and gametes, embryo recovery, in vitro fertilization, tissue culture, hormone measurements, and directed individual research problems. *Prerequisite:* Consent of instructor. ¼ to ¾ unit.

441. Advanced Design and Analysis of Biological Experiments

Same as CPSC 441. See CPSC 441.

444. Immunobiological Methods

Same as VP 444. See VP 444.

463. Radioisotopes in Biological Research: Principles and Practice

Same as BIOPH and V B 463. See V B 463.

490. Animal Sciences Seminar

Discussions of current research and literature. Registration for 0 to ½ unit each semester is expected for animal sciences graduate students. 0 to ½ unit. May be repeated to a maximum of ½ unit for Masters students and 1 unit for Ph.D. students.

492. Advanced Topics in Animal Sciences

Selected topics associated with teaching, research, and production related to the animal

industry. *Prerequisite:* Consent of instructor. ¼ to 1 unit.

493. Research Studies in Animal Sciences

Directed and supervised study of selected research topics in Animal Sciences. *Prerequisite:* Consent of instructor. ¼ to 1 unit. May be repeated to a maximum of 1 unit.

499. Thesis Research

0 to 4 units.

ANTHROPOLOGY

Acting Head of Department: Richard Wheeler
Department Office: 109 Davenport Hall, 607 South Mathews Avenue, Urbana
Phone: 333-3616

URL: www.anthro.uiuc.edu/Department

Anthropology (ANTH)

102. Anthropology: Human Origins and Culture

Introduction to and survey of human origins and evolution, physical anthropology, race and racism, archaeology, and the beginning of human civilization. Recommended though not required to be taken with ANTH 103 as a survey of the field of anthropology. 4 hours.

103. Introduction to Cultural Anthropology

Survey of cultural anthropology; deals with the nature of culture and its various aspects including social organization, technology, economics, religion, and language, as these are manifest in contemporary traditional and Western societies; gives attention to distinctive theoretical anthropological approaches and to anthropological perspectives of culture change. 4 hours.

104. Talking Culture

Same as LING 104. Introduction to linguistic anthropology, focusing on the role of language in the creation and maintenance of society and culture and on a person's concept of self within that culture. Demonstrates how language use within a community can serve as the foundation for the analysis of cultural practices. 3 hours.

105. Introductory World Archaeology

Using archaeological data, traces our prehistoric heritage and the processes which led to the evolution of agriculture, settled villages, and civilization in many areas of the world; lectures range from the earliest humans to *Homo sapiens* and from Sumeria and Egypt to Mexico, Peru, and the United States. 3 hours.

107. Archaeology of Ancient Egypt

Survey of Egyptian archaeology from prehistoric times through the New Kingdom; includes lectures on modern archaeological techniques developed in Egypt to presentations on the history, life, gods, and architecture.

of this ancient civilization. *Prerequisite:* ANTH 102 is recommended. 3 hours.

108. The Sacred Mind: Religion and Society in Western Thought from Antiquity to the Enlightenment

Same as PHIL, SOC, and RELST 108. See RELST 108.

109. The Secular Mind: Religion and Society in Western Thought from the Enlightenment to the Present

Same as PHIL, SOC, and RELST 109. See RELST 109.

112. Symbols in Anthropology

Introduction to the principles and methods of symbolic anthropology including the role that symbols play in society, and how symbolic meanings are derived and changed. Applications to contemporary American culture, focusing on the University of Illinois as an institution and a community, are developed in the course. 3 hours.

141. Race: The Concept in Anthropology

Examines the biological concept of race as applied and misapplied to *Homo sapiens* by anthropologists and others from the 18th century to the present and of the origin, nature, and significance of so-called racial variation. 3 hours.

143. Biological Bases of Human Behavior

Same as HDFS 143. Critical consideration of data and information bearing on current controversies and ideas concerning the antecedents of selected aspects of human behavior. Topics to be discussed include communication; social organization; and parental, sexual, and aggressive behavior. 3 hours. Credit is not given for both ANTH 143 and 144.

144. Biological Bases for Human Behavior (Honors)

Critical consideration of data and information bearing on current controversies and ideas concerning the antecedents of selected aspects of human behavior. Topics to be discussed include communication; social organization; and parental, sexual, and aggressive behavior. Special for honors students—emphasizes a "hands on" laboratory-demonstration approach. 3 hours. Credit is not given for both ANTH 144 and 143.

146. Human Remains and the Law

Surveys forensic anthropology, the application of physical anthropology and ancillary biological sciences in the identification of human remains (or their traces) when standard means (e.g., fingerprints) fail. Readings will include case studies; students will be involved in data gathering and analyses. 3 hours. Credit is not given for both ANTH 146 and 356.

149. Evolution and Human Disease

Principles of modern evolutionary theory are applied to medical problems. Topics include: transmission, pathogen strategies, symptoms and spectrum of disease, evolution of virulence, concept of cause, antimicrobial resistance, emerging diseases, stress and adaptation, nutrition, diachronic overview of changing patterns of human disease and eco-

logical factors. 3 hours. Students may not receive credit for both this course and ANTH 179.

150. Novel Archaeology

Designed for nonanthropology majors; survey course of prehistory as seen through the eyes of novelists, science fiction writers, as well as visual media; covers 2 million years of prehistory examining what happened in the past as well as the interface between fact and fiction and past and present. 3 hours.

157. The Archaeology of Illinois

Traces the prehistory of Illinois from the first entry of people into the region more than 13,000 years ago until the 17th century and the beginning of historical records; examines subsequent cultural changes up to the 19th century and statehood from an archaeological and ethnohistorical perspective. 3 hours.

160. Anthropology of Contemporary Issues

Course considers how anthropological theory and methods enhance our understanding of contemporary social and political issues, including immigration, education, affirmative action, and welfare. It examines the relationship between social policy and social science knowledge, and the juxtapositioning of anthropological, policy, and other analytical approaches to contemporary issues. It assesses the strengths and limits of anthropological knowledge—its qualitative, ethnographic, and narrative character—for addressing these issues. 3 hours.

165. Languages and Peoples of Native North America

Develops understanding of the rich diversity of languages and cultures found among Native North American peoples from the perspectives of sociocultural and linguistic anthropology. 3 hours.

168. Introduction to the Civilization of India

Same as HIST 168. See HIST 168.

179. Culture and Ecology in Human Health
Overview of health and illness in human societies emphasizing interactions among stress, adaptability, and culture. Case studies of differing cultural and ecological settings, past and present, and of differing health care systems are related to alternative theories of health and illness, including contemporary cosmopolitan medicine. 3 hours.

180. Anthropological and Archaeological Perspectives on Death

Cross-cultural introduction to the celebration of death across time and space. Examines the anthropological and archaeological literature on death, particularly in terms of death ritual and burial practices, study popular films on death in different cultures, and carry out a field project at a local cemetery. 3 hours.

182. Peoples and Cultures of South America

South America considered as a theater of conflict and cultural experimentation among Native American, African, and Iberian peoples; their survival and transformation as reported in selected ethnographies and eyewitness

sources; and some modern theories and controversies about their experience. 4 hours.

186. Southeast Asian Civilizations

Same as AS ST 186 and HIST 172. Overviews the cultural and institutional history of the Indianized states and Vietnam, with attention to dominant commercial, political, religious, artistic, and social traditions of Southeast Asia. 3 hours.

190. American Jewish Culture

Examines American Jewish experience in its cultural and historical diversity. Introduces the approaches of cultural anthropology in order to investigate how an ethnic group has elaborated and continues to elaborate its identity in American culture and society through strategies of individual and collective behavior. In this way, American Jewish identities emerge as the products of specific interactions between Judaism's overarching cultural system and local American cultural formations. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

210. Comparative Family Organization

Same as HDFS 210. See HDFS 210.

213. African Oral Literature

Same as AFRST and C LIT 213. See AFRST 213.

214. Introduction to Museum Studies

Introductory survey of museum studies, including curation, conservation, development and ethics. *Prerequisite:* Sophomore status. Preference given to students interested in museum career. 2 hours.

215. Museum Studies Laboratory

Introduction to the day-to-day functions of a museum. Weekly lecture and rotation through various areas of the Natural History Museum provide a hands-on experience. *Prerequisite:* ANTH 214. 2 hours.

220. Introduction to Archaeology

Introduction to the problems of studying past cultures; special attention given to the ranges of techniques available and the adequacy of various methodologies as bases for sound inference about the structure of extinct cultures. *Prerequisite:* ANTH 102, or consent of instructor. 3 hours.

221. Materials and Civilization: An Overview of Archaeometry

Introduction to the instrumental methods used to analyze archaeological and museum artifacts to solve questions of dating, authenticity, composition, provenience, and technology. Both organic and inorganic materials are considered in their cultural contexts, using examples from both Old and New World archaeology. Lecture/discussions are supplemented with visits to campus laboratories and museums. 3 hours.

222. Introduction to Modern Africa

Same as AFRST, POL S, and SOC 222. See AFRST 222.

223. Memoirs of Africa

Same as AFRST 223. Course introduces Africa to students who have read little or nothing about the continent. The course will provide a "user-friendly" approach by offering engagingly written narratives of actual lives lived. The texts are a combination of memoirs written by Africans (about their childhood experiences growing up in various regions of Africa) and by non-African scholars and other authors (including but not limited to anthropologists) who have spent significant amounts of time on the continent. *Prerequisite:* Completion of campus Composition I general requirement. 3 hours.

225. Women in Prehistory

Same as W S 225. Course identifies the presence of women in the archaeological record and seeks to reconstruct women's lives and roles in a range of ancient societies. It also considers the intellectual history of gender studies in archaeology and anthropology. 3 hours.

230. Introduction to Social Anthropology and Ethnology

Introduction to the anthropological study of contemporary human societies; emphasis on the comparative study of social organization, interpersonal relations, cultural ecology, and processes of sociocultural change, but also includes some consideration of the method and theory of ethnological field research. *Prerequisite:* ANTH 103, or consent of instructor. 3 hours.

231. African and Indigenous Americans of South America

Same as AFRO 231. Contemporary African American and Indigenous American people of South America constitute dynamic cultures that extend across national borders. Taken together, these two diaspora aggregations of people, one displaced in the Americas, the other displaced from Africa and Europe, provide evidence of extraordinary cultural, social, and ethnic endurance in the face of radical and relentless change. Course combines information on both African-American and Native-American cultures in ethnographic and comparative perspectives. *Prerequisite:* ANTH 103 or 182 or 230, or consent of instructor. 3 hours.

240. Introduction to Biological Anthropology

Past and present evolution of the human species and population and individual biological variation; topics include genetic principles relevant to human evolution, primate phylogeny and behavior, fossil evidence for human evolution, and the origin and significance of biological diversity in modern man. *Prerequisite:* ANTH 102 or 143; or an introductory life sciences course; or consent of instructor. 3 hours.

243. Natural History and Social Behavior of the Great Apes

Same as EEE 243. Examines the social organization, mating patterns, and group structure of free-ranging chimpanzees, gorillas, and orangutans. Presents historical perspective focusing on misconceptions which have colored our understanding of ape social behavior.

ior; addresses questions concerned with learning potential, food sharing, social cooperation, aggressive behavior, self-awareness, and the appropriateness of the apes as models for understanding human behavior. *Prerequisite:* ANTH 102, 143, or an equivalent course in animal behavior; or consent of instructor. 3 hours.

244. Anthropology of Play

Same as KINES 244. See KINES 244.

258. People of the Ice Age

Explores a vast period of human prehistory—2 million to 10,000 years ago—before the first cities arose and before people domesticated plants and animals in the Old World; uses archaeological and paleoanthropological data to understand past life ways as well as reasons for change through time in human adaptation. *Prerequisite:* ANTH 102. 3 hours.

259. Spanish-Speaking Peoples in the United States

Same as LLS 259. Introduction to the Spanish-speaking population of the United States, including demography, history, economics, and aspects of the sociocultural milieu; emphasis on Mexican-Americans and Puerto Ricans, although other Spanish-speaking groups are also considered. *Prerequisite:* ANTH 103, or consent of instructor. 3 hours.

260. Peoples of the World: Introduction to Ethnography

Study and criticism of ethnographic descriptions of exotic ways of life, both as scientific reporting and as a literary art form. Readings include examples from several major culture areas: Africa, the Americas, the Middle East, Oceania, southern and eastern Asia, and Western civilization. *Prerequisite:* ANTH 102, 103, or consent of instructor. 3 hours.

261. Afro-American Societies and Cultures

Same as AFRO 261. See AFRO 261.

262. Cultural Images of Women

Same as WS 262. Perceptions of women, their perceptions of themselves, and their varying roles and statuses in several contemporary societies in diverse countries; supervised ethnographic observation of women's behavior. 3 hours.

264. Plants and Their Uses

Same as PLBIO 263. See PLBIO 263.

265. Ethnicity in the United States: Anthropological Perspectives

Course examines the history and present day circumstances of a variety of U. S. ethnic groups. It uses the tools of ethnography and history to explore this complex topic. The first half of the course explores 18th and 19th century ethnicities by combining historical and ethnographic methods. The second half focuses on contemporary ethnic movements and theories about them. *Prerequisite:* ANTH 103. 3 hours.

266. African Film and African Society

Same as AFRST 266. Introduction to African cinema as a contemporary art form and as a window on the social and cultural realities of Africa. The course will include discussion of

modern African culture, the African film industry, and African cinema as an art form and as popular entertainment. 3 hours.

268. Images of the "Other": Anthropological Perspectives

Do all peoples view neighboring or distant populations as radically different "Others," or can humans create mutual images based on a notion of shared humanity? Course compares and analyzes the range of images of ethnic, "racial", gender, class and bodily differences that have been enacted historically and cross-culturally in both Western and non-Western populations. *Prerequisite:* A previous course in history and/or one of the social sciences would be helpful. 3 hours.

269. Latinas and Latinos Challenging the Anthropological and Literary Landscape

Same as LLS 269. Theoretical and methodological perspectives on the construction of Latina/Latino identities in contemporary American society. 3 hours.

270. Introduction to Linguistic Anthropology

Introduction to linguistic anthropology as a major subdiscipline within the field of anthropology; problems of elicitation and analysis of language as faced by anthropologists; and the role of language in the other major subdisciplines: biological, archaeological, and social anthropology. *Prerequisite:* ANTH 103 or LING 200, or consent of instructor; completion of Campus Composition I general education requirement. 3 hours.

276. Aztec Civilization

Detailed description and analysis of Aztec culture, society, and empire at c. 1500 AD, based primarily on ethnohistorical documentation. Topics covered include life cycle, family and society, political and economic organization, warfare, religion, and intellectual and aesthetic traditions. External relationships with neighboring peoples and the indigenous view of the Spanish conquest are considered. *Prerequisite:* ANTH 102, 103, or 105. 3 hours.

277. Anthropological Perspectives on Cities and the Built Environment

Examine urban development from its origins to the present day. Among the concepts covered are urbanism, urbanization, ceremonial centers and ceremonial cities, the city as a system, the spatial and economic organization of cities, and the built environment (sacred landscapes, vernacular architecture, places of power). Small field project is conducted in Champaign-Urbana. 3 hours.

280. Personal Anthropology

Anthropological approaches and methods related to the student's everyday life situation; explanation and use of ritual, ideology, myth, communication, media images, rites of passage, structure, symbols, and other concepts so that the student may develop a more critical understanding of contemporary American society and his or her position in it. 3 hours.

281. Introduction to Chinese Culture and Society

Same as EALC 281. Comprehensive introduction to Chinese culture and society based on ethnographic studies, theoretical analysis, and historical survey. Topics cover crucial issues concerning China's past, present and future, with an emphasis on conditions in the last two decades of the 20th century. 3 hours.

287. Asian American Experiences

Same as SOC 287. Overview of the historical, social, cultural, and artistic aspects of the experiences of Asian Americans in the United States. Attention will be paid to the 19th and 20th century immigration experience; the nature of the family and community over time in the diverse Asian American groups; and contemporary socio-economic and political issues facing Asian Americans. We will consider East, South, and Southeast Asians and their similarities and differences in adapting to the United States. 3 hours.

290. Individual Study

Supervised reading and research on anthropological topics chosen by the student with staff approval. Especially (but not exclusively) for students who are preparing for a summer field-work project, or who have some justifiable reason for doing independent study, but who do not qualify for the honors (departmental distinction) courses. *Prerequisite:* Junior or senior standing; 12 hours in anthropology; consent of instructor. 2 to 4 hours. May not be taken concurrently with ANTH 291 or 293.

291. Honors Individual Study

Individual study and research projects for those students who are candidates for departmental distinction in anthropology. *Prerequisite:* Senior standing; 3.2 GPA in anthropology; consent of instructor. 2 to 4 hours. May not be taken concurrently with ANTH 290. (Counts for advanced hours in L.A.S.)

293. Honors Senior Thesis

Preparation and completion of a senior honors thesis, research paper, or equivalent project for those students who are candidates for high or highest departmental distinction in anthropology. *Prerequisite:* Senior standing; 3.2 GPA in anthropology; consent of instructor. 2 to 4 hours. May not be taken concurrently with ANTH 290. (Counts for advanced hours in L.A.S.)

296. Special Topics

Topics are given on a one-time only, experimental basis. Faculty offer special topics in their areas of expertise that provide an opportunity for undergraduates to be exposed to some of the most current developments in faculty research. 1 to 3 hours. May be repeated.

297. Honors Seminar

Each seminar considers a topic or issue of current interest in anthropology. *Prerequisite:* ANTH 102 and 103, two additional anthropology courses, a GPA of 3.25 in anthropology courses, and consent of instructor. 3 hours. May be repeated as topics vary to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

300. Introduction to Linguistic Structure

Same as LING 300. See LING 300.

303. Women in Muslim Societies

Same as HIST, RELST, and W S 303. See RELST 303.

307. Introduction to Mathematical Linguistics

Same as LING 307. See LING 307.

308. Human Evolutionary Anatomy

Comprehensive, comparative study of musculoskeletal anatomy in primates, focusing on functional and adaptive changes that have occurred in the masticatory apparatus, facial skeleton, and locomotor systems of New World monkeys, Old World monkeys, apes, and humans. Relationships between morphology, ecology, and behavior are discussed, applied to the fossil record, and used to address current issues in human evolution. *Prerequisite:* ANTH 343 or 340 or 356, or a course in human or comparative vertebrate anatomy. 3 hours or 1 unit.

310. Human Evolutionary Anatomy Lab

Comparative detailed dissections of craniofacial, locomotor, neural, and alimentary systems in nonhuman primates, to understand the anatomical bases of human evolution. *Prerequisite:* Credit or concurrent registration in ANTH 308. 3 hours or 1 unit.

315. Area Studies in Ethnomusicology

Same as MUSIC 317. See MUSIC 317.

316. Anthropology of Music

Same as MUSIC 316. See MUSIC 316.

318. Anthropological Research Design

Examines the design of anthropological research; covers the philosophical basis of research design, different approaches to framing questions and designing research, sampling, questionnaire design, data collection techniques, research ethics, coding, and general problems of measuring quantitative and qualitative data. *Prerequisite:* ANTH 220, 230, 240, or 270 and a course in statistics; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

321. Social Organization and Structure

Introduction to anthropological concepts of social organization and structure; considers kinship theory, descent and alliance systems, social stratification, nonkin association, social networks, group identification and boundaries, structural-functional interpretations of society, and the meaning of social or cultural structure. *Prerequisite:* ANTH 230 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

322. Analyzing Quantitative Anthropological Data

Examines strategies for the discovery and exploration of patterning in quantitative anthropological data. Emphasis on the philosophy of data analysis, exploratory and computer-intensive methods, and hands-on application to the analysis and interpretation of real data sets collected by the students. *Prerequisite:* ANTH 318. 4 hours or 1 unit.

323. Economic Anthropology

Covers the emergence of economic anthropology as a subdiscipline; considers various definitions of economics with their implications for the study of human society; emphasizes

the relationship between social organization and economic life from the perspectives of classical studies in anthropology and their contemporary interpretations. *Prerequisite:* ANTH 230. 3 hours or 1 unit.

325. Analyzing Qualitative Anthropological Data

Examines strategies for the exploration and analysis of anthropological data in the form of words and documents. Emphasizes the hands-on application of these strategies to the analysis and interpretation of real data sets collected by the students. Covers data reduction; text management and retrieval; coding; within-, between-, and cross-case analyses; data matrices; critical analysis of anthropological documents; content analysis; validity and reliability issues; and the preparation of research reports. *Prerequisite:* ANTH 318. 4 hours or 1 unit.

326. The Rise of Civilization in Ancient Peru

Survey of the early inhabitants of Peru and emergence of complex society in pre-Inca era. *Prerequisite:* ANTH 220 or ANTH 328, 357, 375, 376 or consent of instructor. 3 hours or 1 unit.

327. Archaeology of the Incas

The rise of the Inca Empire, its culture and art. The societies conquered by the Incas are also studied. *Prerequisite:* ANTH 220, or ANTH 328, 375, 376 or consent of instructor. 3 hours or 1 unit.

328. North American Archaeology

Methods, techniques, and results of archaeology in North America; focuses on divergent approaches to the regional archaeology of North America; and surveys and synthesizes the archaeology of the subcontinent. *Prerequisite:* ANTH 220 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

329. The Philosophy of Social Science

Same as PHIL 375 and SOC 325. See PHIL 375.

330. The History and Historiography of Anthropology

Provides a selective overview of the history and historiography of anthropology in the 19th and 20th centuries. The class moves chronologically and topically, paying particular attention to the social, institutional, and historical contexts of paradigmatic shifts, the interconnections between various national traditions, and the negotiations of the discipline's boundaries. *Prerequisite:* Graduate or senior standing in anthropology, or consent of instructor. 4 hours or 1 unit.

333. South American Indians of the Andean Region

Survey of Andean cultures at the time of the Spanish conquest, of their subsequent history, and of modern Indian culture in the Andean countries. *Prerequisite:* ANTH 230 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

335. Ethnography of Local Cultures

Same as EDPSY and SOC 335. See EDPSY 335.

336. Native Peoples and Cultures of Greater Amazonia

Develops cross-cultural understanding of contemporary native peoples around the rim of and within Amazonia; examines culture history, history, and ecology prior to study of selected cases; deals with adaptive versatility of contemporary native peoples as well as with radical change. *Prerequisite:* ANTH 103, 182, 230, or consent of instructor. 3 hours or 1 unit.

339. Anthropological Theory in Contemporary Perspective

Exploration of current theory in social and cultural anthropology, with emphasis on examining theories in the light of contemporary ideas about theoretical adequacy and of the historical development of anthropological thought; designed especially for anthropology majors and anthropology graduate students. *Prerequisite:* ANTH 230 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

340. Human Evolution, I

Principles of evolution and a survey of human evolution from the early primates through the Pleistocene epoch; emphasis on evolutionary theory as applied to humans and interpretation of the fossil record. *Prerequisite:* ANTH 240 or an introductory life sciences course, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

341. Human Evolution, II

Same as ANSCI 341. Principles of human genetics; anthropological aspects of race and race formation; and hereditary and environmental factors in the biological variation of modern humans. 3 hours, or $\frac{3}{4}$ or 1 unit.

342. Behavior-Genetic Analysis

Same as EEE 350 and PSYCH 342. See PSYCH 342.

343. Introduction to Primate Morphology and Behavior

Same as EEE 344. Survey of primate social behavior and the classification, morphology, and distribution of living and extinct species; emphasis on interrelationships among behavior, biology, and ecology. *Prerequisite:* ANTH 240 or EEE 246; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

344. Field and Laboratory Techniques in Biological Anthropology

Supervised participation in biological anthropology research projects; techniques, methods, and procedures discussed and practiced under actual field or laboratory working conditions. Normally taken concurrently with ANTH 345. *Prerequisite:* ANTH 240 or equivalent; consent of instructor. 3 hours or 1 unit. May be repeated as topics vary. Usually offered in the summer session only.

345. Analysis of Research Data in Biological Anthropology

Analysis, interpretation, evaluation, and organization of field and laboratory data in biological anthropology; preparation of written reports on research. May be taken concurrently with ANTH 344 or subsequently. *Prerequisite:* ANTH 240 or equivalent; consent of instructor. 3 hours or 1 unit. May be repeated

as topics vary. Usually offered in the summer session only.

346. Animal Behavior

Same as ANSCI, BIOL, and EEE 346. See EEE 346.

348. The Prehistory of Africa

The study of cultural development in Africa from the appearance of hominids to the time of European domination. *Prerequisite:* ANTH 220 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

351. Archaeological Surveying: Techniques and Applications

Familiarization with methods used in the location and recording of archaeological sites, including techniques of mapping especially adapted to the needs of archaeology; attention given to means of presenting results and interpreting data derived from this work; and work both in the field and in the laboratory. *Prerequisite:* ANTH 102 or consent of instructor. 3 hours or 1 unit.

352. Theory and Methods of Lithic Analysis

Lecture and laboratory on the principles and techniques of stone and bone artifact manufacture, identification, classification, metrical analysis, interpretation, and integration with other classes of archaeological evidence. Emphasis on the use of lithics to test human behavioral models. *Prerequisite:* ANTH 220. 3 hours, or $\frac{3}{4}$ or 1 unit.

353. Field Work in Cultural Anthropology: Theory and Methods

Major philosophical, theoretical, and methodological issues that arise in conducting cultural-oriented anthropological field work today; application of class knowledge to an actual field experience; emphasis on field work as a reflexive experience and as a mutually creative and frustrating endeavor. *Prerequisite:* ANTH 230 or graduate standing. 3 hours or 1 unit.

354. Field Techniques in Archaeology

Participation in archaeological excavations; techniques, methods, and procedures discussed and practiced under actual working conditions. Normally taken concurrently with ANTH 355. *Prerequisite:* ANTH 102, or consent of instructor. 3 hours or 1 unit. May be repeated as topics vary. Usually offered in the summer session only.

355. Laboratory Techniques in Archaeology

Laboratory work including processing, classifying, dating, interpretation, evaluation, and preparation of written reports of archaeological research. May be taken concurrently with ANTH 354 or subsequently. *Prerequisite:* ANTH 102 or consent of instructor. 3 hours or 1 unit. May be repeated as topics vary.

356. Human Osteology

Identification of human skeletal material and basic techniques of measurement; methods of determining age, sex, race, and stature from the human skeleton; and analysis of skeletal populations. *Prerequisite:* ANTH 102 or a course in anatomy, physiology, or introductory life sciences and consent of instructor. 3

hours or 1 unit. Credit is not given for both ANTH 356 and 146.

358. Paleo-Faunal Analysis

Introduces students to the use of faunal remains as they pertain to archaeological research programs. Presents and critically assesses a number of approaches to the analysis of faunal remains as to their usefulness to particular research designs. *Prerequisite:* Open to Anthropology majors with senior or graduate standing. 4 hours or 1 unit.

359. Forensic Anthropology

Examines current research and techniques in the application of physical anthropology to legal investigations, primarily in the identification of human skeletal material, but also in other characterization and identification of human remains and traces (e.g., footprints); also considers expert witness testimony and ethical issues in such application. *Prerequisite:* ANTH 356 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

360. Peoples and Cultures of Oceania

Same as AS ST 360. Survey of the Pacific Islands; regional geography, human ecology, culture history, and ethnography of Melanesia, New Guinea, Polynesia, New Zealand, Micronesia, and Australia; and some consideration of Pacific ethnohistory and the role of Oceania in the modern world. *Prerequisite:* ANTH 102 and 103, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

361. Peoples and Cultures of Mexico and Guatemala

Survey of the peoples and cultures of Middle America with special emphasis upon Mexico and Guatemala; begins by placing Middle America geographically, historically, and culturally within the broader Latin American scene; countries first viewed as a whole and then selected ethnographic studies of specific communities considered for comparative purposes. The Caribbean is not included in this survey. *Prerequisite:* ANTH 230 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

362. Modern Europe: Anthropological Perspectives

Historical studies which deploy anthropological methods in the study of early modern and modern Europe; looks at processes of twentieth century modernization through ethnographic studies. Western, Central, and Eastern Europe will all receive attention, but the study of Western Europe will predominate. *Prerequisite:* ANTH 103 and 230 or three history courses or graduate standing. 4 hours or 1 unit.

363. Religion in Anthropological Perspective

Same as RELST 363. Course focuses on theoretical issues raised by religion. Does religion address itself essentially to intellectual, emotional or pragmatic issues? Is religion created by rulers, clerics or worshippers? How does the individual experience religion, and (how) can s/he reshape it? In exploring these and related issues, we will read the writings of German, French, and British social scientists of the past 150 years as well as work by contemporary anthropologists. Theoretical per-

spectives covered include symbolic, processual, materialist, structural-functionalist, structuralist, and postmodernist approaches. *Prerequisite:* A 200-level course in cultural anthropology or consent of instructor; or graduate standing. 4 hours or 1 unit.

364. Field Work in Cultural Anthropology

Supervised participation in field research in ethnography, ethnology, linguistics, or social anthropology; techniques, methods, and procedures discussed and practiced under actual working conditions. *Prerequisite:* ANTH 230 or 300; some knowledge of the language of the area concerned; consent of instructor. Normally taken concurrently with ANTH 365. 3 hours or 1 unit. May be repeated as topics vary. Usually offered in the summer session only.

365. Analysis of Field Data in Cultural Anthropology

Analysis, interpretation, evaluation, and organization of field data in cultural anthropology; preparation of written reports on research in ethnography, ethnology, linguistics, or social anthropology. May be taken concurrently with ANTH 364 or subsequently. *Prerequisite:* ANTH 230 or 300; some knowledge of the language of the area concerned; consent of instructor. 3 hours or 1 unit. May be repeated as topics vary.

366. Class, Culture, and Society

Social hierarchies in a variety of cultural contexts; industrial societies and the process of industrialization; looks at other social forms for the purposes of comparison. A variety of social theories will be discussed and compared through ethnographic studies. *Prerequisite:* ANTH 103 and 230 or graduate standing. 4 hours or 1 unit.

367. Cultures of Africa

Culture and social organization in traditional African societies with emphasis on the politics, kinship, and religion of a small sample of societies illustrating the main cultural variations found in sub-Saharan Africa; some discussion of ecological factors and ethnic group relations in precolonial times. *Prerequisite:* ANTH 230 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

368. Religions of Africa

Same as RELST 368. Course will consider religious acts, beliefs and experiences in Africa as they relate to politics, cosmology, social structure, gender norms and markers, aesthetics and performance, and illness and healing, among other factors. Religious traditions that first originated in sub-Saharan Africa will be emphasized, but some consideration will also be given to local African experiences of Christianity and Islam. *Prerequisite:* At least one previous course in either Cultural Anthropology, Religious Studies or African Studies; or consent of instructor. 3 hours or 1 unit.

370. Mind, Culture, and Society

Same as COMM and LING 370. Introduces students to the field of cognitive anthropology and its relation to cognitive science. Language and the application of linguistic methods to problems in the social and cognitive sciences are emphasized and also the relevance of the ethnographic method to cognitive science in

general. Visual and kinesthetic dimensions of knowledge are also explored. *Prerequisite:* ANTH 230, or one course in communications or linguistics, or consent of instructor. 3 hours or 1 unit.

373. Theory and Method in the Cross-Cultural Study of Individual Social Behavior

Same as PSYCH 373. See PSYCH 373.

374. Mesoamerican Art and Iconography

Comparative analysis of the iconographic (symbolic) content of elite art and architecture of precolumbian Mesoamerican societies. Emphasis is placed on describing and interpreting basic shared features of cosmology and the ideological aspects of social and political systems discerned from surviving artworks. *Prerequisite:* ANTH 102 or 105 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

375. The Prehistory and Archaeology of Mexico

Discusses the ancient cultures and civilizations of Mexico as reconstructed from archaeological data; begins with the earliest evidence of human occupation and traces the development of agricultural societies and ultimately large urban civilizations to c. 1300 A.D. *Prerequisite:* ANTH 105 or 220; or consent of instructor. 3 hours or 1 unit.

376. Archaeology of the Maya and Aztecs

Discusses and analyzes the archaeological data related to two important indigenous Mesoamerican civilizations, the Maya and Aztecs. Major topics considered include interpretations of political and social organization, subsistence systems, religion, and writing systems. Problems in correlating archaeology and ethnohistory are also examined. *Prerequisite:* ANTH 220 and 375. 3 hours or 1 unit.

377. Pottery Analysis

Introduction to the theories and techniques of pottery analysis for archaeologists. In addition to presentation and discussion of the major literature, there is hands-on practice making, drawing, breaking, and analyzing pottery. *Prerequisite:* Either ANTH 220, 375, or 376, or consent of instructor. 3 hours or 1 unit.

378. Advanced Computer-Assisted Methods in Archaeology

Examines advanced, computer-assisted methods for the analysis of archaeological data. Covers database design basics, seriation, correspondence analysis, discriminant analysis, cluster analysis, archaeological stratigraphy, assemblage diversity analyses, and the analysis and interpretation of radiocarbon dates. Applies these methods in the analysis and interpretation of archaeological data using the Bonn Archaeological Statistics Package and the MYSTAT and SYSTAT statistical packages. *Prerequisite:* ANTH 322 or equivalent. 4 hours or 1 unit.

379. Medical Anthropology: The Culture of Health and Illness

Introduction to concepts and social aspects of health, illness, and curing in different cultures with consideration also of the interaction between folk and modern medicine in developing nations and the delivery of health care as

an international social problem. *Prerequisite:* ANTH 230 or 260, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

380. Symbolic and Interpretive Anthropology

Focus on recent developments in symbolic and interpretive anthropology; topics covered include writing the ethnographic text, subject-object relations, critical reflection on fieldwork, construction of the self, dialogism, practice, performance, narrative, power, and representation. *Prerequisite:* ANTH 321 and 363, or similar courses in anthropology, the social sciences, or the humanities, and consent of instructor. 4 hours or 1 unit.

383. Self and Society in Japan

Same as EALC 383. The lifecourse and the growth of the self in modern Japanese civilization. *Prerequisite:* ANTH 230 or a course in East Asian history, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

384. Family, Gender, and Population in Contemporary China

Same as EALC 384. Explores the interworking of family system, gender dynamic and demographic process in response to socioeconomic and political changes in contemporary China. Urban-rural differentiation and regional and ethnic diversities will be examined. *Prerequisite:* ANTH 230 or equivalent; ANTH 281. 3 hours or 1 unit.

385. Anthropology of Education

Same as EDPSY and E P S 385. See E P S 385.

386. Peoples and Cultures of Mainland Southeast Asia

Same as AS ST 386. Culture, cultural history, and social systems of mainland Southeast Asia: Burma, Thailand, Cambodia, Vietnam, Laos, Assam Hills, upland southwestern China, and Malaya; emphasis on the interaction of complementary ethnic types in the context of local ecology and the Hindu-Buddhist systems of religion and politics of the lowland states. *Prerequisite:* ANTH 220 or 230, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

391. Topics in Museum Studies

Course uses campus museums to introduce students to research on collections, conservation, collections management, exhibit design and installation, public relations, and planning educational programs. Emphasis varies from year to year. Students participate in current research projects at the museums. *Prerequisite:* ANTH 214 and 215 or consent of instructor. 4 hours or 1 unit. May be repeated in separate semesters to a maximum of 8 hours or 2 units.

394. Human Paleopathology

Comprehensive study of the evidence of human disease in antiquity, emphasizing diagnosis of skeletal pathologies, and the anthropological interpretation of historic and prehistoric disease patterns. *Prerequisite:* ANTH 356, a course in human anatomy, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

398. Combined Graduate and Undergraduate Seminar

Research seminar on specialized topics in anthropology. *Prerequisite:* Consent of instructor. 4 hours or 1 unit. May be repeated.

400. Introduction to General Linguistics

Same as E I L 402 and LING 400. See LING 400.

420. Ethnicity in China

Same as EALC 420. Explores ethnic diversity and ethnic relations in China. Topics include the multi-ethnic history of Chinese society, communist and Western theories on nationality and ethnicity, the state and ethnicity, ethnic conflict and political economy, gender and ethnic hierarchy. *Prerequisite:* ANTH 384 or consent of instructor. 1 unit.

440. Problems in Physical Anthropology

Seminar designed to involve students in the theoretical and methodological approaches to problem areas in physical anthropology. May be repeated for additional credit. *Prerequisite:* ANTH 340, 341, or 343; consent of instructor. 1 unit.

443. Problems in Primate Behavior and Ecology

Same as EEE 443. Group discussions and individual presentations of research reports and problems in fields of primate ethology, ecology, evolution, and related subjects; topics vary each semester. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ or 1 unit. May be repeated.

450. Seminar in Anthropology

Analysis of selected topics of special interest in anthropology. $\frac{1}{2}$ or 1 unit. May be repeated for up to 2 units per semester.

452. Research Problems in Archaeology

Seminar oriented to current research problems in archaeology, designed to acquaint students with theoretical and methodological aspects of particular problems and to develop a critical perspective of archaeological research. *Prerequisite:* Consent of instructor. 1 unit. May be repeated.

453. The Formal Analysis of Kinship Systems

Survey of a variety of the world's systems of kinship, marriage, and family organization; concentration on the distinctive properties of kinship systems as a species of social structure, on the formal apparatus for describing and understanding them and their functions, and on the theory of kinship that arises from the use of such formal apparatus. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ to 1 unit.

454. Ritual and Power in Social Life

Systematic examination of the relationship between power structure and ritual by reference to anthropological theory and through consideration of select ethnographies; social stratification, social networks cultural symbolism, and ethnicity. *Prerequisite:* Consent of instructor. 1 unit.

455. Archaeological Approaches to Cultural Complexity

Examines patterns of behavior archaeologists associate with complex societies and seeks to understand if and how these behaviors generate and/or reflect cultural complexity; theoretical literature and case studies discussed. Major topics include mortuary studies, settlement pattern analysis, and theory. *Prerequisite:* Graduate student standing. 1 unit.

456. Research Problems in Ethnohistory

Seminar oriented to current research problems in anthropological applications of ethnohistory, designed to acquaint students with theoretical and methodological issues and principal documentary sources for a specific world area. Students will undertake a major project analyzing documents. *Prerequisite:* Consent of instructor. 1 unit. May be repeated in the same or separate semesters to a maximum of 2 units.

457. Social Construction of Space

Consideration of anthropological, archaeological, and related disciplinary perspectives on space, place, landscape, the built environment, and architecture. Course work encompasses critical review of major theoretical literature and case studies of ancient and modern societies. *Prerequisite:* Consent of instructor. 1 unit.

459. Proseminar in Biological and Cultural Evolution

Critical review of the major theoretical perspectives of human biological and cultural evolution; examines the historical bases of these perspectives and their influence on contemporary theories and interpretations. *Prerequisite:* Graduate standing in the Department of Anthropology or consent of instructor. 1 unit.

460. Proseminar in Ethnological Theory

History of modern ethnological thought. Focusing on social and cultural anthropological theories, it takes a topical approach to theoretical problems and emphasizes the development of analytical skills. *Prerequisite:* Graduate standing. 1 unit.

461. Archaeological Theory

History of theory in archaeology. Different theoretical approaches are examined by critically analyzing the seminal literature within the contexts of paradigmatic shifts in archaeology and general developments in the discipline of anthropology. 1 unit.

463. Feminist Theory in Anthropology

Same as WS 463. Theoretical issues raised in recent feminist writings in anthropology. Theoretical approaches to be explored include constructionist, postmodern, textual and historical materialist perspectives. Selected contemporary ethnographies introduce the integration of feminist theory into data analysis. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

467. Kinship and Social Organization in Africa

Explores a variety of systems of kinship and social organization in sub-Saharan Africa; covers classic statements on African kinship, which provide a foundation of modern

kinship theory, as well as contemporary critiques. Then explores the nature of political authority and stratification systems; presents topical and theoretical issues as well as selected case studies. *Prerequisite:* Graduate standing. 1 unit.

468. Colonialism and Culture

Same as HIST 468. Course examines the history of colonialism and post-colonialism in anthropological perspective. The relations of history and anthropology are explored through ethnographic studies which problematize historical memory. Theoretical works of colonized people will be debated and discussed. *Prerequisite:* Graduate standing. 1 unit.

470. Proseminar in Cognitive Science

Same as C S 449, LING and PHIL 470, and EDPSY and PSYCH 471. In-depth view of cognitive science: the study of mind and intelligence. Covers major areas of cognitive science including: anthropology, artificial intelligence, cognitive neuroscience, cognitive psychology, emotions, linguistics, and philosophy. Lectures focus on prominent questions and issues in each area highlighted by descriptions of current research. Also explores interconnections among these fields. *Prerequisite:* Minimally second semester graduate standing in a cognitive science discipline including: anthropology, computer science, educational psychology, electrical engineering, linguistics, philosophy, psychology, or consent of instructor. ½ to 1 unit.

475. Leisure and Culture

Same as KINES and LEIST 475. See LEIST 475.

480. Dissertation Writing Seminar

Through reading style handbooks, theoretical works on the nature of writing, and published dissertations in anthropology, as well as completing specific dissertation writing assignments, this course provides a forum for advanced doctoral students to outline and complete substantial work on their doctoral thesis. The class format is a workshop in which every student circulates dissertation chapters for discussion by the instructor and other class members. *Prerequisite:* Students must have completed all requirements for the Ph.D. in anthropology but the dissertation, and they must have completed their doctoral fieldwork. 1 unit.

489. Readings in Anthropology

Individual guidance in intensive readings in the literature of one or more subdivisions of the field of anthropology, selected in consultation with the adviser in accordance with the needs and interest of the student. *Prerequisite:* One semester of graduate work in anthropology; consent of adviser. ½ or 1 unit.

490. Individual Topics in Anthropology

Supervised individual investigation or study of a topic not covered by regular courses. The topic selected by the student and the proposed plan of study are approved by the adviser and the staff member who supervises the work. *Prerequisite:* Consent of instructor. 1 to 4 units.

499. Thesis Research

Preparation of theses. 0 to 4 units.

ARABIC

(See Linguistics)

**ARCHITECTURE,
SCHOOL OF**

Director: R. Alan Forrester

School Office: 117 Temple Buell Hall, 611 Taft Drive, Champaign

Phone: 333-1330

URL: www.arch.uiuc.edu

Architecture, School of (ARCH)

171. Architectural Design, I

Formal fundamentals of architectural design; formal vocabulary, principles, and concepts of architectural design; basic design methods; skills development in sketching, drafting, rendering, layout, diagramming, modeling, and lettering; and creative problem-solving in two- and three-dimensional exercises. *Prerequisite:* ARTGP 187 or equivalent and sophomore standing. 3 hours.

172. Architectural Design, II

Functional fundamentals of architectural design; functional vocabulary, principles, and concepts of architectural design; basic design and programming methods; skills development in drafting, modeling, layout, rendering, and sketching; and creative problem-solving in two- and three-dimensional exercises. *Prerequisite:* ARCH 171. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Senior Honors in Architecture

For candidates for honors in architecture. Independent guided study and research in a selected area of architecture. *Prerequisite:* Senior standing in architecture, a University GPA of 3.0 or, in special cases, consent of Director of School. 3 hours. (summer session, 1 to 3 hours). May be repeated to a maximum of 6 hours with consent of Director of School.

210. Introduction to the History of Architecture

Visual and cultural analysis of selected buildings, urban spaces, and cities, from ancient Greece to modern times; emphasizes the architectural traditions of Western Civilization, especially as they affect the built environment of America and the Middle West. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

215. Buildings, Land, and Cultural Traditions: Diversity and Change
Same as LA 215. See LA 215.

231. Anatomy of Buildings

First course in building science and technology with emphases on the anatomy of buildings, including the function, the physical makeup and the working principles of various building systems, components, and materials, their interrelationships and their building design implications. *Prerequisite:* Sophomore standing or consent of instructor. 4 hours.

232. Construction of Buildings

Second course in building science and technology with emphases on the process of project execution from the initiation of design to the completion of construction. Includes comprehensive study of the construction of buildings and their systems, materials and methods, and their implications on building sustainability and design decision-making. *Prerequisite:* ARCH 231 or consent of instructor. 4 hours.

241. Environmental Technology, I

Study of the control of thermal environment, mechanical and related building sub-systems, and their integration into the overall building design. The specific topics include: thermal comfort and the behavioral implications; fundamentals of thermal behavior of buildings; the principles of heat and moisture in buildings; indoor air quality and "Sick Building Syndrome"; energy and sustainability implications of building design; and mechanical systems including HVAC and plumbing systems. *Prerequisite:* ARCH 232. 4 hours.

242. Environmental Technology, II

Study of the control of luminous and sonic environments, the supporting building systems, and their integration into the overall building design. Specific topics include: lighting fundamentals; light sources; effects of lighting on comfort and performance; lighting calculations and design; energy economy and sustainability; acoustic fundamentals; room acoustics; noise control; and basic electrical and sound systems. *Prerequisite:* ARCH 232. 4 hours.

251. Statics and Dynamics

Study of equilibrium of rigid bodies in two and three dimensions; trusses; shear and bending moments in beams; arches and frames; cables; friction; introduction to dynamics; architectural applications. *Prerequisite:* MATH 120. 4 hours.

252. Mechanics of Materials and Design Applications

Study of stresses, strains, and deformations in axially loaded members; direct shear and bearing stresses; torsion; beam stresses and deflections; stresses under combined loading; column buckling; design of structural members; introduction to statically indeterminate structures; architectural applications. *Prerequisite:* ARCH 251. 4 hours.

271. Architectural Design, III

The building in its environmental setting; introductory building design and site planning theory; principles of energy efficient building

design; man-environment relationships theory; and architectural design and presentation methods. *Prerequisite:* ARCH 172. 3 hours.

272. Architectural Design, IV

Buildings in the community setting; introductory urban design and site planning theory; man-environment relationships theory; and architectural design and presentation methods. *Prerequisite:* ARCH 271. 3 hours.

299. Study in Versailles, France

Study in the University of Illinois Architectural Program at Versailles, France. *Prerequisite:* Concurrent registration in the full-time program at Versailles through the Chicago or Urbana-Champaign Campus. 0 hours.

300. Independent Studies in Urban Design

The individual study of selected topics involving the history, design, and function of significant European cities. *Prerequisite:* One year of history of architecture or Art History; consent of instructor. 3 hours or $\frac{3}{4}$ unit.

301. Independent Study

Independent guided study and investigation in a selected area of architecture. *Prerequisite:* Junior standing in architecture, written proposal approved by sponsoring faculty member and approval of Director of School. 0 to 4 hours, or 0 to 1 unit.

309. Great Modern Architects

Seminar on selected topics addressing the philosophy, theory, personality, and work of significant architects since the mid-nineteenth century. *Prerequisite:* ARCH 210. 3 hours or $\frac{3}{4}$ unit.

310. Ancient Architecture

Architecture and urban design in ancient Egypt, Greece, and Rome. *Prerequisite:* ARCH 210, ARTHI 111, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

311. Early Christian and Byzantine Architecture

Architecture and urban design of the early Christian era, the Byzantine Empire, southeastern European lands under Byzantine cultural influence, and medieval Russia; from circa 300 to circa 1500. *Prerequisite:* ARCH 210, ARTHI 111, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

312. Medieval Architecture

The development of Romanesque and Gothic architecture and urban design. *Prerequisite:* ARCH 210, ARTHI 111, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

313. Renaissance Architecture

Developments in architecture, urban design, and garden art in Italy and northern Europe in the fifteenth through the sixteenth centuries. *Prerequisite:* ARCH 210, ARTHI 112, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

314. Baroque and Rococo Architecture

Developments in architecture, urban design, and garden art in Italy, France, Germany, and England in the seventeenth and eighteenth centuries. *Prerequisite:* ARCH 210, ARTHI 112, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

315. Neoclassical and Nineteenth Century Architecture

Evolution of Continental and British architecture and urban planning from 1750 to World War I; includes some reference to American architecture of the same period. *Prerequisite:* ARCH 210 or ARTHI 112, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

316. Modern American Architecture

Development of American architecture and urban planning from the seventeenth century to the present. *Prerequisite:* ARCH 210, ARTHI 112, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

317. Twentieth-Century Architecture

Developments in Western architecture and urban design from 1900 to the present; examines the rise of modernism in Europe and, after World War II; includes work in the United States, India, Japan, and Australia. *Prerequisite:* ARCH 210 or ARTHI 112, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

318. History of the Urban Environment

Examines the evolution of town planning and urban design in Western civilization from prehistory to the present; studies cultural and technical advancements affecting the form of the urban environment. 3 hours or $\frac{3}{4}$ unit.

319. Historic Building Preservation

Introduces historic preservation: legal, financial, and administrative assistance, graphic examination of restored buildings and sites, and application of conservation technology. 3 hours or $\frac{3}{4}$ unit.

323. Social and Behavioral Factors for Design

Research-oriented introduction to existing social and behavioral knowledge, methods, and tools for relating man to his physical and social environment, with implications for theories and a philosophy of architectural design. *Prerequisite:* Consent of instructor. 3 hours or $\frac{3}{4}$ unit.

324. Gender and Race in Contemporary Architecture

Same as W S 324. Analyzes how the built environment reflects social attitudes towards gender and race. Identifies the work of women and people of color in architecture and related disciplines as consumers, critics, and creators of the environment. Provides links with valuable professional networks in Chicago and elsewhere. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

330. Architectural Practice

Role of the architect in the building enterprise, professional ethics, and the conduct of professional practice; legal aspects of architectural practice and building construction; introduction of business management, marketing, operational procedures, financial planning, and cost control of architectural practices; and the administration of construction contracts. *Prerequisite:* Graduate standing or consent of instructor. 4 hours or 1 unit.

351. Theory and Design of Steel and Timber Structures

Analysis and design of steel and timber structures for buildings. Steel columns, beams,

trusses, connections, roof and floor framing systems; timber beams, columns, roof and floor framing systems. *Prerequisite:* ARCH 252. 4 hours or 1 unit.

352. Theory of Reinforced Concrete
Concrete materials; behavior of reinforced concrete construction; behavior and design of structural elements, one-way slabs, beams, and girders; columns; ACI code requirements; and introduction to continuity in reinforced concrete structures. *Prerequisite:* ARCH 252. 4 hours or 1 unit.

353. Reinforced Concrete Design
Selection, design, and comparison of reinforced concrete floor systems for buildings; study and design of columns and footings; and prestressed concrete. *Prerequisite:* ARCH 352. 4 hours or 1 unit.

354. Structural Planning
General problems in the selection and design of structural systems for buildings; methods of analysis; site explorations, soils, and foundations; bracing; and special systems. *Prerequisite:* ARCH 351 and 352. 4 hours or 1 unit.

355. Structural Analysis
Advanced problems in the analysis of statically determinate structures; general theories and methods of analysis of statically indeterminate structures by geometric and energy methods; and introduction to theory of plastic design. *Prerequisite:* ARCH 351 and 352. 4 hours or 1 unit.

371. Architectural Design, V
Intermediate building and environmental design; issue-oriented building problems; urban design theory; intermediate building design and site planning theory; human-environment relationships theory; and architectural design and presentation methods. *Prerequisite:* ARCH 272. 6 hours. No graduate credit.

372. Architectural Design and Construction Documentation
Schematic design, design development, and construction documents of a small scale (10,000 square feet) public building emphasizing the integration of the basic elements of building, structural, and environmental technologies. *Prerequisite:* ARCH 371; credit or concurrent registration in ARCH 241 and 242. 6 hours. No graduate credit.

373. Architectural Design Studio
Design studies of intermediate size building types; planned communities; civic and social facilities at the community and urban scale; and collaboration among the several disciplines involved in planning the human habitat: urban planning, landscape architecture, sociology, and economics. *Prerequisite:* ARCH 372. 6 hours or 1½ units.

374. Architectural Design Studio
Research and individual comprehensive design study for a selected architectural project; special emphasis on site development and the integration of construction technology, structure, and environmental systems. *Prerequisite:* ARCH 373, or consent of instructor. 6 hours or 1½ units.

398. Directed Research in Architecture
Participation in on-going research projects which may include energy management, environmental perception, facilities development, building science, and other topics. *Prerequisite:* Approval of written proposal by instructor and Director of School. 4 hours or 1 unit. Students may register in different sections of this course to a maximum of 8 hours or 2 units.

399. Off-Campus Study
Provides opportunity for approved off-campus study. Detailed proposal for study off campus must be submitted for approval to the appropriate committee in the School prior to such study. Final determination of credit and its application toward the degree is made after a review of the student's off-campus work by the above committee and the Director of School. *Prerequisite:* Senior or graduate standing in architecture and approval of program prior to registration. 0 to 12 hours, or 0 to 3 units.

411. Seminar in History of Ancient and Medieval Architecture
Seminar on topics in ancient, early Christian, Byzantine, and Medieval Architecture. *Prerequisite:* ARCH 310, 311, or 312, or equivalent as determined by the instructor. 1 unit.

413. Seminar in History of Renaissance and Baroque Architecture
Seminar on topics in European architecture from the fifteenth through the eighteenth centuries. *Prerequisite:* ARCH 313 and 314, or equivalent as determined by the instructor. 1 unit.

415. Seminar on the Architectural History of American Communities
Advanced historic study of the architectural design and aesthetics of individual buildings and their relationship to each other in selected small-scale American communities. *Prerequisite:* ARCH 316 or equivalent, and consent of instructor. ½ or 1 unit.

417. Seminar in the Development of Contemporary Architectural Thought
Examination of the development of the philosophy of significant modern and contemporary architectural writers and architects in relation to their projects and executed work. *Prerequisite:* ARCH 315 and 316, or equivalent as determined by the instructor. 1 unit.

418. Recording Historic Buildings
Examines techniques for recording historic buildings and sites: measuring, photographing, and drawing to Historic American Building Survey standards; taking field notes and investigating public records to document reports. *Prerequisite:* ARCH 319 and demonstrated ability in architectural graphics; or consent of instructor. ¾ unit.

419. Conservation of Building Materials
Examination, analysis, and pathologies of building materials and techniques for treatment and repair of historic buildings. Emphasis is on conservation of traditional masonry, concrete, and metals. Field trips and lab work. *Prerequisite:* ARCH 319. ¾ or 1 unit. To receive 1 unit credit, students must participate in lab.

430. Management and Business Administration in Architecture
Study of management and business administration topics relevant to the architecture profession. The application of: marketing, ethics, accounting, organizational behavior, quantitative analysis, finance, operations, economics, and strategic planning to the field of architecture. Management and economic issues that influence and motivate commercial, industrial, institutional, and individual clients are addressed. *Prerequisite:* Graduate standing in Architecture. 1 unit.

434. Building Economics
Study of factors affecting cost of building including: the building market, construction cost, estimates and cost control, time value of money and building life-cycle cost, measuring the worth of investments, depreciation and tax consideration of cash-flows. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

438. Economic Issues in Architectural Development
Individual and team analysis of architectural development proposals addressing relevant economic topics and trends. Proposals are analyzed for development, construction, finance, operation, and sale costs. Potential and projected rate of return on investment is established for specific time periods. Economic and social forces impacting upon real estate values are examined. *Prerequisite:* ARCH 330, 430, and 434; or consent of instructor. 1 or 1½ units.

444. Building Systems and Design Integration
Advanced course on building design for greater performance, including the study of: the anatomical and functional variations of building subsystems and their design implications; inter-system relationships and synergistic integration of building subsystems into the overall building; and the strategies for designing buildings of high functional performance and greater overall value. (Day-long Friday field trips and lab fee.) *Prerequisite:* Graduate standing in Architecture or consent of instructor. ¾ or 1 unit. Term paper is required for 1 unit credit.

445. Design and Constructability
Advanced course on building design for greater constructability, including material alternatives and their architectural, performance, and construction implications; the implications of the specifics of design on the range of applicable construction methods, and therefore, on construction productivity and economy; and the strategies for designing buildings of high constructability and greater overall value. (Day-long Friday field trips and lab fee.) *Prerequisite:* ARCH 444 or consent of instructor. ¾ or 1 unit. Term paper is required for 1 unit credit.

447. Architectural Practice Studio
Comprehensive building design with emphasis on holistic design integration for optimum performance and constructability with best possible economy under the realistic temporal, technical, legal, and budgetary limitations.

The projects, typically real ones, are executed through partial construction document phase through collaborative design by project teams. (Day-long Friday field trips.) *Prerequisite:* ARCH 434 and 445; or consent of instructor. 2 units.

448. Construction Execution and Administration

Advanced course in construction with emphasis on acquiring knowledge and developing skills for successful project execution in a real-time project with numerous variables affecting the project outcome, including: devising methods and strategies for effective project execution; making decisions that can steer the project to the best possible direction; and skillfully mediating disputes and conflicts that might arise. For this purpose, on-going major construction projects are used as Learning Laboratories. *Prerequisite:* ARCH 330 and 445; or consent of instructor. 1 unit. (Summer I credit: ¼ unit; Summer II credit: ½ unit.) May be repeated in subsequent semesters to a maximum of 2 units.

451. Advanced Structural Analysis

Advanced theory and analysis of statically indeterminate structures, recognizing effects due to temperature, settlement, and fabrication errors; matrix methods focusing on computer analysis techniques; introduction to plastic analysis and design. *Prerequisite:* ARCH 355. 1 unit.

452. Foundation Engineering

Soil mechanics and site exploration; design of spread footings, combined footings, piles, and caissons; and foundation walls and retaining walls in reinforced concrete. *Prerequisite:* ARCH 355 or consent of instructor. 1 unit.

453. Advanced Reinforced Concrete Design

Critical review of the analysis, methods, and specifications involved in the design and behavior of reinforced concrete structures for buildings, including tall buildings, plates, and shells; computer applications. *Prerequisite:* ARCH 355; credit or concurrent registration in ARCH 451 or consent of instructor. 1 unit.

454. Advanced Steel Design

Advanced topics in the design of steel structures; critical study of the AISC specification; design of steel members and their connections; composite structures; and the analysis and design of continuous structures and tall buildings. *Prerequisite:* ARCH 451 or consent of instructor. 1 unit.

455. Prestressed Concrete Design

Theory and design of prestressed concrete structures; and suspension shell structures. *Prerequisite:* ARCH 453 or consent of instructor. 1 unit.

456. Advanced Structural Planning

Study of the loads, functional and spatial requirements, and construction problems in the selection and design of structural systems for buildings; cost estimates; and integration of mechanical and electrical equipment. *Prerequisite:* ARCH 452 and 453; credit or concurrent registration in ARCH 454 and 455, or consent of instructor. 1 unit.

457. Soil Mechanics

Classification of soils; hydraulic properties and flow of water; strength and deformation properties; consolidation of soil and settlement analysis; soil exploration; bearing capacity of soils; lateral earth pressure theory; introduction to foundations. *Prerequisite:* ARCH 352. 1 unit.

458. Structural Wood Design

Analysis and design of wood structures for buildings; response of wood buildings to gravity and lateral loads; design of structural elements: beams, columns, beam-columns, members in tension, and trusses using NDS specifications; connections; plywood panels; diaphragms and shear walls. *Prerequisite:* ARCH 351 or equivalent. 1 unit.

459. Structural Masonry Design

Engineering properties of masonry materials; codes and standards for masonry structures; analysis and design of masonry structures including multistory buildings and arches. *Prerequisite:* ARCH 352 or equivalent. 1 unit.

461. Housing Environments Design Studio, I

Emphasizes comprehensive design studies on individually selected housing problems; the study process includes programmatic development, environmental analysis, definitive design development and comprehensive project documentation. *Prerequisite:* ARCH 374 and 466. 1 to 2 units.

462. Housing Environments Design Studio, II

Terminal design studio studies on individually selected housing problems; emphasizes definitive design development and process documentation for final project. *Prerequisite:* ARCH 461. 1 to 2 units.

463. Methods of Social and Behavioral Research in Designed Environments

Same as LA 463. Introduction to methods and techniques of systematically generating social and behavioral information relevant to the programming, design, and evaluation of physical environments. *Prerequisite:* Graduate standing in architecture, landscape architecture, or urban and regional planning. 1 unit.

464. Conducting Social and Behavioral Research in Designed Environments

Same as LA 464. See LA 464.

465. Design/Behavior Studio

Same as LA 465. See LA 465.

466. Problems and Processes in Housing Design

Analyzes issues confronting architects in the design of housing environments; emphasizing new and emerging problems; examines processes in problem solutions. *Prerequisite:* Concurrent registration in ARCH 374 or consent of instructor. 1 unit.

471. Architectural Design Studio

Definitive design thesis focusing on design issues and various building types with optional choices related to the student's particular interests, talents, and capacities. *Prerequisite:* ARCH 374 or consent of instructor. 1 to 2 units.

472. Architectural Design Studio

Continuation of ARCH 471. *Prerequisite:* ARCH 471 or consent of instructor. 1 to 2 units.

476. Architectural Design Seminar

Presentations and discussions relative to various areas of architectural and environmental design concerns. *Prerequisite:* ARCH 374 or consent of instructor. ¾ or 1 unit. May be repeated to a maximum of 3 units.

477. Theory of Architecture

Review of principles of architectural design; factors in programming architectural requirements; design development; and evaluation and criticism. *Prerequisite:* ARCH 374 or consent of instructor. ¾ or 1 unit.

481. Urban Design Studio, I

Same as LA 481. Design of large building types, building complexes and communities, involving collaboration with other disciplines in research related to urban development. *Prerequisite:* ARCH 374; credit or concurrent registration in UP 326 or consent of instructor. 1 to 2 units.

482. Urban Design Studio, II

Same as LA 482. Design studies of central business districts, residential communities and other urban development projects; collaboration with other disciplines in research related to urban development. *Prerequisite:* ARCH 481, U P 326, or consent of instructor. 1 to 2 units.

488. Urban Design Seminar

Analysis and criticism of urban development projects; individual reports and discussions. *Prerequisite:* ARCH 374, U P 326, or consent of instructor. ¾ to 1 unit.

491. Special Problems in Architectural History and Preservation

Individual investigation of the work of particular architects, of specific buildings, and of the architecture of periods or regions; comparative studies; and aesthetic problems. *Prerequisite:* Twelve hours of architectural history or consent of instructor. ½ to 3 units. May be repeated to a maximum of 3 units.

493. Special Problems in Architectural Practice and Management

In-depth investigation of emerging issues and specific areas of research interest beyond what is covered in graduate courses of regular offering in the area of architectural practice and management. Students, as individuals or in groups, are expected to propose a research plan and methods for a specific topic of research interest in consultation with the instructor, and execute it under the guidance of the instructor through consultation on a regular basis. *Prerequisite:* Advanced graduate standing and consent of instructor. ¼ to 3 units. (summer credit: ¼ to 1½ units.) May be repeated in same and subsequent semesters as topics vary to a maximum of 3 units.

494. Special Problems in Building Science and Technology

In-depth investigation of emerging issues and specific areas of research interest beyond what is covered in graduate courses of regular offering in the area of building science

technology. Students, as individuals or in groups, are expected to propose a research plan and methods for a specific topic of research interest in consultation with the instructor, and execute it under the guidance of the instructor through consultation on a regular basis. *Prerequisite:* Advanced graduate standing and consent of instructor. $\frac{1}{4}$ to 3 units. (summer credit: $\frac{1}{4}$ to $\frac{1}{2}$ units). May be repeated in both subsequent and separate semesters to a maximum of 3 units.

495. Special Problems in Structural Theory and Design

Individual or group investigation and study in architectural engineering application; research in economy and design in correlation with architectural, mechanical, and structural requirements. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ to 3 units. May be repeated to a maximum of 3 units.

496. Special Problems in Housing Environments

Individual investigation or research in housing environments involving special issues such as energy conscious design, human-environmental relations, aesthetic theory, government policy, and cultural patterns. *Prerequisite:* ARCH 374 or consent of instructor. $\frac{3}{4}$ to $1\frac{1}{2}$ units. May be repeated to a maximum of 3 units.

497. Special Problems in Architectural Design

Individual investigation of building types and systems, aesthetic theories, design thesis programming and other problems in architectural design. *Prerequisite:* ARCH 374 or consent of instructor. $\frac{3}{4}$ to 3 units. May be repeated to a maximum of 4 units.

498. Special Problems in Urban Design

Individual investigation of problems at the community and urban scale; collaboration with other disciplines. *Prerequisite:* Credit or concurrent registration in ARCH 481 or U P 326, or consent of instructor. $\frac{3}{4}$ to 3 units. May be repeated to a maximum of 3 units.

499. Thesis Research

Prerequisite: Consent of instructor and graduate program coordinator. 0 to 4 units. May be repeated to a maximum of 4 units.

ART AND DESIGN, SCHOOL OF

Director of School: Dietmar R. Winkler
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Including Introduction to Art and Design (ART&D), Cinematography (ARTCI), Crafts (ARTCR), Art Education (ARTED), General Professional Courses in Art and Design (ARTGP), Graphic Design (ARTGD), History of Art (ARTHI), Industrial Design (ARTID), Art Painting (ARTPA), Photography (ARTPH), Printmaking (ARTPR), and Sculpture (ARTSC)

Introduction to Art and Design (ART&D)

103. Introduction to Studio Arts

Introductory studio experiences with a variety of art materials and techniques accompanied by visitations to artists' studios and museum tours. 3 hours. Not open to students majoring in art and design. Credit is not given for both ART&D 103 and 190.

105. Introduction to Watercolor Painting

Basic watercolor class that includes an introduction to the tools, materials, and techniques of the medium; landscape, still life, and figure experiences. 3 hours. Not open to students majoring in art and design. May be repeated to a maximum of 6 hours.

106. Introduction to Oil Painting

Elementary oil and acrylic painting and sketches from still life and landscape; includes basics such as stretching canvas, preparing surfaces, and varied painting techniques. 3 hours. Not open to students majoring in art and design. May be repeated to a maximum of 6 hours.

107. Elementary Drawing

Basic drawing course using a variety of media and techniques, including charcoal, conte, pencil, pen and india ink, and studies in perspective, line, value, composition, and the figure. 3 hours. Not open to students majoring in art and design. May be repeated to a maximum of 6 hours.

108. Ikebana: The Japanese Art of Flower Arrangement

Introduces Japanese arts and cultural heritage through Ikebana (Japanese flower arranging). 2 hours.

109. Sumi-E (Japanese and Chinese Black-Ink Painting)

Introduction to the ancient abstract Chinese art of black-ink painting; through the study and practice of Chinese and Japanese Sumi-E students discover the foundation of twentieth-century visual arts and discuss the philosophy of Chinese and Japanese art. 2 hours.

140. Introduction to Art

Broadly based conceptual foundation for a critical understanding of the visual arts in contemporary society. 3 hours. Not open to students in art and design and architecture.

185. Design, I

Design elements and principles with emphasis on color and painting exercises; uses a variety of media to explore the different aspects of design, emphasizing two-dimensional problems. 3 hours. Not open to students majoring in art and design.

186. Design, II

Second course in design with emphasis on graphic communication; students gain experience using modern graphics equipment. *Prerequisite:* ART&D 185. 3 hours. Not open to students majoring in art and design.

190. Recreational Crafts, I

Introduction to design and execution in crafts particularly adapted to work with children in schools, playgrounds, and summer camps. Primarily for recreation majors in physical education. *Prerequisite:* Sophomore standing or consent of instructor. 2 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

209. Japanese Tea Ceremony and Zen Aesthetics

The tea ceremony and culinary arts of Japan practiced as the physical discipline necessary for Zen aesthetic experience. 2 hours. May be repeated to a maximum of 4 hours.

401. Individual Art Enquiry

Explores the perspectives of the relationship of science and art through three main topics: individual perspectives and responses; physiology and art; and the relationship of art's origins to form and structure. *Prerequisite:* Graduate standing in art education, or related fields with consent of instructor. 1 unit.

Cinematography (ARTCI)

180. Introduction to Cinematography

Introduction to the principles and techniques of cinematography as applied to individual expression. 3 hours.

181. Screenplay Writing for Motion Pictures—Basic

Basics of motion picture scriptwriting from the synopsis, through the treatment, to the final continuity of the script. Word processor is a must. Propensity for writing. *Prerequisite:* Fulfillment of campus Composition I requirement and consent of instructor. 3 hours.

280. Basic Cinematography

Fundamentals of the theory and practice of motion pictures as an art form, with emphasis on principles, tools, and techniques. *Prerequisite:* ARTCI 180 or consent of instructor. 3 hours.

281. Screenplay Writing for Motion Pictures, II

Continuation of ARTCI 181. Character development, dramatic structure, perfecting the form and style, refining the expository elements, rewriting and refining the screenplay until the first draft. Skills in operating and access to a word processor are a requirement. *Prerequisite:* ARTCI 181. 3 hours.

291. Individual Cinematography Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in Art and Design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

380. Cinematography

Theory and practice of motion pictures as an art form; emphasis on individual creative production. Anticipated cost to the student for each semester is \$150 to \$600. Costs should be discussed with the instructor before enrollment. *Prerequisite:* ARTCI 280 or consent of instructor. 3 hours, or ½ to 1 unit. May be repeated to a maximum of 12 hours or 4 units.

491. Special Problems in Cinematography

Directed individual creative activity or research. *Prerequisite:* ARTCI 380. ½ to 2 units. May be repeated to a maximum of 8 units.

Crafts (ARTCR)**160. Jewelry/Metals, I**

Design and execution of jewelry and related objects through fabrication, focusing on surface embellishment, joining, and finishing processes; exploring metal as a medium of personal aesthetic expression. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

161. Jewelry/Metals, II

Additional experience and experimentation in designing and executing jewelry and related objects through fabrication, refinement of surface embellishment, joining, and finishing skills; further exploration of metal as a medium of personal aesthetic expression. *Prerequisite:* ARTCR 160. 3 hours.

170. Ceramics, I

Introduction to materials and techniques involved in the ceramic process. By achieving technical expertise in clay, students can begin to develop a personal artistic language employing clay as an art medium. Students will explore a variety of assignments employing the potters wheel and hand-building techniques, as well as investigating various firing processes. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

171. Ceramics, II

Investigation and refinement of skills involved in ceramic processes and materials. Further investigation of more complex forms on the potter's wheel as well as hand-built sculptures and vessels will help the student develop a personal identity with the material and its potential. *Prerequisite:* ARTCR 170. 3 hours.

260. Jewelry Metals, III

The design and production of jewelry and related objects with additional experience in manipulative techniques such as casting, electroforming, surface decoration, enamelling, complex construction and forming. *Prerequisite:* ARTCR 161 and enrollment in the crafts curriculum. 3 hours.

261. Jewelry Metals, IV

Expands the general techniques of ARTCR 260 with emphasis on experimentation and development of personal style through advanced techniques of hollowware, complex construction, enamelling, electroforming and plating, forging and the use of varied materials. *Prerequisite:* ARTCR 260. 3 hours.

262. Metal Technology

Understanding of the working properties of nonferrous metals. Experimentation with little known processes of metalwork to be subjects of individual research. *Prerequisite:* ARTCR 260 and junior standing in crafts, or consent of instructor. 2 hours. May be repeated to a maximum of 4 hours.

263. Metalsmithing

Experience and experimentation in designing and executing hollowware through traditional forming processes; emphasis on sinking, angle raising, crimping, stretching, seaming and snarling, cold forging, tube and spiculum forming, planishing, surface embellishment, and patination; exploration of metal as a medium of personal aesthetic expression. *Prerequisite:* ARTCR 160 or consent of instructor. 3 hours. May be repeated to a maximum of 12 hours.

264. Jewelry Metals, V

Expands the general techniques of ARTCR 261 with emphasis on experimentation and development of personal style. *Prerequisite:* ARTCR 261. 5 hours.

265. Jewelry Metals, VI

Continuation of ARTCR 264; emphasis on experimentation and development of personal style, a portfolio, and a senior exhibition. *Prerequisite:* ARTCR 264. 5 hours.

266. Enamelling

Exploration and experimentation in image development and color through traditional enamelling processes; emphasis on cloisonné, champlevé, bassetaille, plique-a-jour, limoges, and grisaille; exploration of enamel and metal as a medium of personal aesthetic expression. *Prerequisite:* ARTCR 160 or consent of instructor. 3 hours. May be repeated to a maximum of 9 hours.

270. Ceramics, III

Introduction to ceramic design for developing basic skills in designing and producing clay products by various hand processes including throwing, handbuilding, and casting. *Prerequisite:* Junior standing in curriculum in crafts. 3 hours.

271. Ceramics, IV

Introduction to ceramic glaze calculation; concern with the understanding and application of the knowledge of glaze calculation in a creative way and with applications of creative experiments in glaze and clay bodies. *Prerequisite:* ARTCR 270. 3 hours.

274. Ceramics, V

The application of the combined skills of throwing and creative glaze procedures to produce thrown ceramic products with the emphasis on creative experimentation; also covers plaster and mold making as a creative procedure in producing clay products. *Prerequisite:* ARTCR 271. 5 hours.

275. Ceramics, VI

Technical and creative research in ceramic design, with emphasis on reappraisal of the traditional media and the traditional limited production method used by artist potters. *Prerequisite:* ARTCR 274. 5 hours.

288. Glass, I

Introduction to all of the basic processes of glass forming, including blowing, casting and oven work. Focus on the development of the hot form and a working knowledge of the specialized processes, tools, and equipment used with glass as a creative material. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

289. Glass, II

Object-making using hot and cold glass. Concentration on the development of personal sensibilities using glass, light and mixed media. Slides, demonstrations and studio time on casting, slumping, fusing, sandblasting and enamelling/painting on glass. This course is directed toward the broad artistic challenge of material expertise and personalized conceptual growth. *Prerequisite:* ARTCR 288. 3 hours.

290. Senior Honors in Crafts

Independent creative activity, guided study, or research for honors. *Prerequisite:* Senior standing in crafts, a cumulative grade point average of 3.0; and consent of instructor, adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Metals Problems

Directed independent creative activity or research in metals. *Prerequisite:* Junior standing in Art and Design. Also completing Independent Study contract with signatures and consent of instructor, student's adviser, and Associate Director of School of Art and Design. 1 to 4 hours. May be repeated to a maximum of 6 hours.

292. Individual Ceramics Problems

Directed independent creative activity or research in ceramics. *Prerequisite:* Junior standing in Art and Design. Also completing Independent Study contract with signatures and consent of instructor, student's adviser, and Associate Director of School of Art and Design. 1 to 4 hours. May be repeated to a maximum of 6 hours.

293. Individual Glass Problems

Directed independent creative activity or research in glass. *Prerequisite:* Junior standing in Art and Design. Also completing Independent Study contract with signatures and consent of instructor, student's adviser, and associate director of School of Art and Design. 1 to 4 hours. May be repeated to a maximum of 6 hours.

370. Kiln Construction: Design, Materials, Function

Design and construction of a kiln. *Prerequisite:* ARTCR 170 and 171, or consent of instructor. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

374. Ceramics

Ceramic design with emphasis on the development of professional style and personal expression. *Prerequisite:* Consent of instructor. 2 to 4 hours, or ½ to 2 units. May be repeated to a total of 6 hours.

384. Glass

Advanced glass design with emphasis on professional development and personal style. *Prerequisite:* Consent of instructor. 2 to 4 hours, or ½ to 1 unit.

491. Special Problems in Crafts

Directed individual creative activity or research. *Prerequisite:* Graduate standing in crafts. ½ to 2 units. May be repeated to a maximum of 5 units.

498. Ceramic-Glass-Metal Laboratory

Individually directed research and personal expression in ceramic, glass, or metal medium. *Prerequisite:* Enrollment in the MFA program with a major in ceramics, glass, or metal, or consent of departmental graduate committee. ½ to 2 units. May be repeated.

Art Education (ARTED)

201. Art in Early Childhood Education

Philosophical and practical foundations for teaching art in early childhood settings. Lectures, discussions and class activities focus on the value of art in the curriculum, artistic development and instruction, observation and guided teaching practice. *Prerequisite:* ART&D 140. 2 hours. Not open to art majors.

203. Art in the Elementary Grades

Introductory laboratory experiences with the elements of design in the visual arts and with processes, materials, and activities appropriate for the elementary grades. 2 hours. Not open to students majoring in art.

204. Art Education Laboratory

Examines methods and studio activities for elementary and secondary schools with a variety of appropriate materials and processes; includes techniques, art activities and practical application for teaching exceptional students, including learning disabled. 2 hours. Must be repeated for a total of 4 hours.

206. Practicum in Teaching Art

Supervised teaching of art to children augmented by a seminar; includes classroom preparation and evaluation. *Prerequisite:* Consent of instructor. 4 hours.

207. Art Curriculum Development and Practicum in the Elementary Schools

Early field experience in local elementary schools one half day weekly; includes identification, instruction, methods, and practicum on the psychology of the exceptional child. *Prerequisite:* ARTED 206; art education majors only. 3 hours.

208. Organization of Public School Art Programs

The selection and arrangement of content for different educational levels; study and evaluation of curricula, equipment, and supplies; and program supervision. *Prerequisite:* ARTED 207 or junior standing in art, or consent of instructor. 3 hours.

280. Professional Seminar in Art Education

Examines responsibilities, methods, and techniques specific to teaching art in elementary and secondary schools; includes the psychol-

ogy of the exceptional child in conjunction with methods of instruction and student teaching experience. *Prerequisite:* ARTED 204 and 207; concurrent registration in ED PR 238 and 242, art education sections only. 4 hours.

290. Senior Honors in Art Education

Independent guided research and study for honors. *Prerequisite:* Senior standing in art education, a cumulative grade point average of 3.0; and consent of instructor, adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Problems in Art Education

Directed independent research or creative activity. *Prerequisite:* Junior standing in art and design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

301. Children's Artistic Development

Historical and contemporary perspectives on children's artistic development, emphasizing relationships between general intellectual growth and the ability to create and respond to works of art. *Prerequisite:* Junior standing, and PSYCH 100 and EDPSY 211. 3 hours, or ¾ or 1 unit.

390. Advanced Art for Elementary Grades

Advanced laboratory experiences in two-dimensional visual art techniques for elementary teachers, supervisors, and principals. *Prerequisite:* Consent of instructor. 2 to 4 hours, or ½ or 1 unit. May be repeated for a maximum of 4 hours or 2 units.

489. Issues in Art Education

Study of fundamental issues affecting education in the visual arts; examines and explores the educational implications of the nature and value of art, the nature of the artist, and the development of the child as an artist and connoisseur. 1 unit. May be repeated to a maximum of 4 units.

490. Curriculum Development in Art

Analysis of curriculum organization in the visual arts; particular emphasis given to a range of curriculum positions in education and general research related to curriculum design. *Prerequisite:* Consent of instructor. 1 unit.

491. Special Problems in Art Education

Individual direction in research and in creative activity; thesis. ½ to 2 units.

499. Thesis Research

Guidance in research and writing theses for advanced degrees. *Prerequisite:* Graduate standing in art education. 0 to 4 units.

General Professional Courses in Art and Design (ARTGP)

113. Orientation to Art and Design

Overview of art and design professions in today's society. 0 hours.

117. Drawing, I

Theory and practice in the elements of drawing. 3 hours. This course is open to Art and Design majors only.

118. Drawing, II

Continuation of ARTGP 117. Theory and practice in the elements of drawing. *Prerequisite:* ARTGP 117. 3 hours. This course is open to Art and Design majors only.

119. Design, I

Theory and practice in the elements of two dimensional design and the study of color. 3 hours. This course is open to Art and Design Majors only.

120. Design, II

Theory and practice in the elements of three dimensional design. *Prerequisite:* ARTGP 119. 3 hours. This course is open to Art and Design majors only.

121. Design Drawing I

Introduction to technical drawing skills as applied to orthographic, pictorial and perspective concepts. Three-dimensional visualization will be emphasized. 3 hours.

122. Design Drawing II

Three-dimensional visualization based on freehand drawing techniques. Advanced perspective concepts including light theory (shade, shadow, and reflection) will be introduced. *Prerequisite:* ARTGP 121. 3 hours.

187. Freehand Drawing

For students in architecture: drawing three dimensional form and space. Intense investigation of perspective in freehand drawing; drawing in class and outside sketchbook assignments from nature, including the human figure in pencil, pen, and other media. *Prerequisite:* Enrollment in Architecture curriculum. 3 hours.

191. Unit One Studio/Seminar in Art and Design

Topics vary; consult *Timetable* or Unit One of office. 1 to 3 hours. May be repeated as topics vary.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

305. Art for Public Places

Introduces the design and construction of free-standing site-specific sculpture for indoor and outdoor settings through the study of existing public works. Includes field trip and the creation of a large-scale project exhibit on campus. *Prerequisite:* Junior standing or consent of instructor. 3 hours or 1 unit.

391. Individual Studio Problems

Directed independent creative activity or research. *Prerequisite:* Junior or graduate standing; consent of instructor, student's adviser, and Associate Director of the School. 1 to 4 hours, or ½ to 1 unit. May be repeated to a maximum of 6 hours or 2 units.

493. Seminar: Introduction to Methods and Criticism

Prerequisite: Graduate standing in art. ¼ to 1 unit.

Graphic Design (ARTGD)

120. Visual Organization

Introduces the discipline and function of graphic design; explores the organization and structure of two-dimensional space as context for visual communication; includes practical exercises in visual perception, visual organization, and visual communication. *Prerequisite:* Sophomore standing in graphic design curriculum or consent of instructor; concurrent registration in ARTGD 300 by students in graphic design. 3 hours.

130. Image Making, I

The understanding and application of the image making process in graphic design, with emphasis on hand-generated images; covers historical, cultural, and technological influences on concept, content, and visual style. *Prerequisite:* ARTGD 120, concurrent registration in ARTGD 140. 3 hours. Graphic Design majors only.

140. Typography

Introduces the discipline, function, and tradition of typography as it relates to visual/verbal communication; explores both technical and formal aspects. *Prerequisite:* ARTGD 120 or consent of instructor; concurrent registration in ARTGD 130 by students in graphic design. 3 hours.

210. Image Making, II

Explores the applications of computer technology in the visual communication process with manipulation of digitized and computer-generated images. *Prerequisite:* ARTPH 115; concurrent registration in ARTGD 230. 3 hours. Graphic Design majors only.

220. Production

Basic information and current methods in the production of multiple printed communications, including printing processes, paper-making, binding and other practices, and the preparation of art work for the various methods of reproduction; field trips required. *Prerequisite:* ARTGD 120 and 140 or consent of instructor; concurrent registration in ARTGD 230 or 240 by students in Graphic Design. 3 hours.

230. Advanced Typography

Further exploration of typographic form and manipulation of variables which affect content, stresses the importance of typographic composition as an integral component of contemporary visual communication design. *Prerequisite:* Junior standing in graphic design curriculum, and ARTGD 130 and 140. 3 hours.

240. Methodology

Goal-directed graphic design problem-solving with emphasis on the methods of thinking and research which precede the making of design; development of systems for objective problem-solving. *Prerequisite:* ARTGD 230. 3 hours.

290. Senior Honors in Graphic Design

Independent creative activity, guided study, or research for honors. *Prerequisite:* Senior standing in graphic design, a cumulative grade point average of 3.0; and consent of instructor, adviser, and associate director of

the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Graphic Design Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in art and design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

300. Design History Survey

Studies the history of design from 1850 to present, exploring design as the visible manifestation of complex cultural forces. Gives attention to major historical movements as well as to the emergence of contemporary design. *Prerequisite:* Enrollment in Graphic Design or Industrial Design or consent of instructor. 3 hours or 1 unit.

332. Experimental Visualization Technologies, I

Exploration and problem solving in visual communication using contemporary software tools and imaging facilities. *Prerequisite:* A 100-level course in graphic design or in industrial design or equivalent; or a 100-level computer science course; or consent of instructor. 3 hours or 1 unit.

333. Experimental Visualization Technologies, II

Continuation of ARTGD 332. *Prerequisite:* ARTGD 332. 3 hours or 1 unit.

360. Sequential Design

Introduces and explores the structure and manipulation of time and space as a context for visual communication, with emphasis on design using type, image, sound, and motion with computer-based hypermedia. *Prerequisite:* Senior standing in graphic design or consent of instructor. 3 hours or 1 unit. May be repeated to a maximum of 9 hours or 3 units.

370. Advanced Graphic Design, I

Research, analysis, and synthesis of complex visual problems; emphasis on modular sequence, symbolic systems, and image making for visual communication. Preparation of a comprehensive portfolio and consideration of professional requirements encountered by the designer in the visual communications industry. *Prerequisite:* ARTGD 240; for graduate credit, consent of graphic design program chair. 4 hours or 1 unit.

380. Advanced Graphic Design, II

Continuation of ARTGD 370. *Prerequisite:* ARTGD 370; for graduate credit, consent of graphic design program chair. 4 hours or 1 unit.

467. Graphic Design Laboratory

Individually directed research in the studio with concentration in graphic design. *Prerequisite:* Enrollment in the MFA program in graphic design or consent of departmental graduate committee. ½ to 1½ units. May be repeated to a maximum of 3 units.

491. Special Problems in Graphic Design

Directed individual creative activity or research. *Prerequisite:* Graduate standing in graphic design. ½ to 2 units. May be repeated to a maximum of 5 units.

History of Art (ARTHI)

101. Introduction to East Asian Art: China and Japan

Same as EALC 120. Thematic introduction to the visual arts of China and Japan, including calligraphy and painting, woodblock prints, sculpture, gardens and architecture. 3 hours.

110. Introduction to Non-Western Art: Africa, the Americas, and Oceania

Highlights of visual arts traditions in black Africa, pre-Columbian America, and the South Pacific; a cross-cultural analysis of non-Western aesthetic systems and forms with a focus on thematic problems rather than style surveys. 3 hours.

111. Ancient and Medieval Art

Development of the visual arts in Western Europe and the Near East in their cultural contexts from prehistoric times until the early fifteenth century; includes Egyptian, Greek, Roman, and medieval art and architecture. 4 hours.

112. Renaissance and Modern Art

Development of the visual arts in Western Europe and the United States in their cultural contexts from the early fifteenth century to the present. 4 hours.

115. Art Appreciation

Broad introduction to the visual arts; surveys media representing the major cultural and historical periods, both Western and non-Western. In addition to required lectures and readings, campus art collections and exhibitions are visited periodically. 3 hours.

210. African Art and Society, I

Introduces the arts of Black Africa, i.e., dance, drama, songs, and poetry, as expressed in a multimedia framework and a social-religious context; surveys the art styles of the Dogon, Senufo, Mende, and Ashanti peoples. 3 hours.

211. African Art and Society, II

Introduces the arts of Black Africa, i.e., dance, drama, songs, and poetry, as expressed in a multimedia framework and a social-religious context; focuses on Yoruba art and surveys the art traditions of southeastern Nigeria, Cameroon, Gabon, Central Africa, and East Africa. 3 hours.

215. Greek Art

Same as CLCIV 217. Survey of architecture, sculpture, and painting of the Greek world from the geometric period to the beginning of the Christian era. 3 hours.

216. Roman Art

Same as CLCIV 218. Survey of architecture, sculpture, and painting of the Roman world from republican times to the age of Constantine, with brief treatment of later Roman art leading to Byzantine. 3 hours.

217. The Development of the Ancient City

Same as CLCIV 231. See CLCIV 231.

218. Ancient Greek Sanctuaries

Same as CLCIV and RELST 232. See CLCIV 232.

222. Medieval Art

The arts of Byzantium and Western Europe from the early Christian era to the Renaissance. 3 hours.

230. Italian Renaissance Art

Architecture, painting, and sculpture, of Italy during the Renaissance. 3 hours.

231. Northern Renaissance Art

Architecture, painting, sculpture, and minor arts of Europe outside Italy in the fifteenth and sixteenth centuries. 3 hours.

235. Baroque Art

Studies European painting, sculpture, and graphic work during the period 1580 to 1700 with emphasis on major masters such as Bernini, Caravaggio, Poussin, Rembrandt, and Velazquez. 3 hours.

240. Art of the Nineteenth Century

Architecture, painting, sculpture, and minor arts of France, Germany, Spain, and England in the nineteenth century. 3 hours.

241. Twentieth-Century European Art

Survey of the major artists and artistic movements in European painting and sculpture from postimpressionism to the present. 3 hours.

250. American Art

Surveys American art and architecture from the colonial period to the present. 3 hours.

260. Introduction to Women and the Visual Arts in Western Culture

Same as WS 263. Explores the complex interconnections of women with the visual arts in Europe and North America from the classical era to the present, including the modes of artistic production and the representation of women in Western society. 3 hours.

269. Spirituality and Experience in the Arts of the Middle Ages

Same as HISTand RELST 269. Elective seminar designed to give advanced undergraduates a deeper understanding of the relationship between religion and human experience in the middle ages. Participants will be encouraged to apply a variety of methodologies derived from anthropology, art history, literary studies and music history to the study of medieval sources. *Prerequisite:* Any course in medieval history, medieval literature, or medieval music. 3 hours. (Counts for advanced hours in L.A.S.)

289. Senior Honors in Art History—BA

Independent guided research and study in a selected area of art history for candidates for the Bachelor of Arts in Art History with departmental distinction. *Prerequisite:* Senior standing in the art history curriculum; a cumulative grade point average of 3.25; an art history grade point average of 3.5; and consent of instructor, department adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours. (Counts for advanced hours in L.A.S.)

290. Senior Honors in Art History—BFA

Directed independent research and study for honors. *Prerequisite:* Senior standing in Fine and Applied Arts art history, a cumulative

grade point average of 3.0, and consent of instructor, adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Art History Topics

Directed independent research or creative activity. *Prerequisite:* Junior standing in art and design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

301. Chinese Art

Same as EALC 301. History of Chinese art from earliest times to the present. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

302. Japanese Art

Same as EALC 302. History of Japanese art from earliest times to the twentieth century. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

310. West African Art and Ideas

Study in depth of West African art styles in time perspective and cultural context, with a special interest in the use of interdisciplinary source materials. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

311. Traditional Art of Pacific Ocean Cultures

Survey of traditional art in Polynesia, Melanesia, and Micronesia, including New Zealand and Australia; emphasizes major style areas and their historical and cultural significance. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

315. The Archaeology of Greece

Same as CLCIV 343. See CLCIV 343.

316. The Archaeology of Italy

Same as CLCIV 344. See CLCIV 344.

318. Etruscan and Italic Art

Same as CLCIV 318. History of early Italic and Etruscan sculpture, painting, and architecture from c. 1000 B.C. to the first century B.C. Emphasis on the international context of Etruscan art and architecture. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

321. Early Christian and Early Medieval Art

Christian art of the Roman Empire, the art of early Medieval Europe (including England and Ireland), and of the Eastern Mediterranean from the third to the eighth centuries. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

322. Byzantine and East Christian Art

Arts of Byzantine, the Crusader States, and Russia from the ninth to the fifteenth centuries. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

323. Romanesque Art

Art and architecture of the Romanesque period. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

324. Gothic Art

Arts of western Europe from the end of the Romanesque period until the Renaissance. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

325. Medieval Manuscripts and Early Printed Books

Surveys manuscript illumination and early book production from 300 to 1500 A.D.; topics include techniques of manuscript illustration and printing production in such masterpieces as the Vatican Virgil, the Utrecht Psalter, the Book of Kells, the Tres Riches Heures, the Gutenberg Bible, and Brant's Ship of Fools. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

330. Topics in Italian Renaissance Art

Special field in the history of painting, sculpture, and architecture of Italy during the Renaissance selected for intensive study. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

331. Topics in Northern Renaissance Art

Special field in the history of painting, sculpture, and minor arts of France, Germany, Spain, and England during the Renaissance selected for intensive study. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

332. Italian Art of the Sixteenth Century

Painting, sculpture, and architecture in Italy from 1500 to 1580. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

333. Italian Art of the 14th and 15th Centuries

Study of Italian painting, sculpture and architecture from circa 1300 to 1500. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

335. Italian Baroque Art

Studies major masters of Italian painting and sculpture during the period 1580-1700, with particular emphasis on art in Rome. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

336. The Age of Rembrandt and Rubens

Studies seventeenth-century art in the Low Countries with extensive treatments of the careers of Rubens and Rembrandt. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

337. Spanish Art of the Golden Age

Study of art in Spain during the sixteenth and seventeenth centuries, with emphasis on major masters such as El Greco, Velazquez, Zurbaran, Montanes, Ribera, Cano, Murillo, and Valdes Leal. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

339. Painting in Eighteenth-Century Europe

Critical survey of the major developments in European painting of the eighteenth century. Emphasis is placed on French artists, but major figures in England, Spain, and Italy are

also considered. *Prerequisite:* Junior standing or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

340. Romantic Art

Studies English, French, and German art from the end of the eighteenth century through 1840; focuses on revivalist movements, historicism, landscape art, and changing conceptions of art and artist during the period. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

341. Realism to Post-Impressionism

Studies European art from 1850 to 1900, with emphasis on French painting. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

342. German and Austrian Painting of the Late Nineteenth and Early Twentieth Centuries

Survey of modern German and Austrian painters and pictorial movements from the 1890s to the period of Hitler, with special emphasis on the expressionist period. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

343. The Art Nouveau in Europe

Survey of the principal artists and artistic currents in the applied arts during the 1890s in Europe; emphasis on individual figures, with an attempt to define the common stylistic and theoretical assumptions of the period. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

344. The Beginnings of Modernism: European Art from Post-Impressionism to World War I

The pioneer movements in modern painting and sculpture, emphasizing the work and ideas of individual major figures. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

345. Twentieth-Century Art in Europe: 1915-1945

Study of the leading personalities and movements in European painting, sculpture, and architecture, with emphasis on painting. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

346. Recent American Painting and Sculpture

Critical survey of developments since World War II with emphasis on questions of quality and personal content and with consideration of the most current tendencies. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

350. Realism and Romanticism in American Art, 1776-1876

Studies the two major directions of art in the United States from independence to the centennial, with focus on major figures and the scientific and philosophical movements which influenced them. *Prerequisite:* One year of art history or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

351. Early American Modernism

Examines American art, particularly painting and sculpture, 1876-1940, against its cultural

background and the relation of the American artist to Europe in an attempt to isolate the roots of Modernism in the United States. *Prerequisite:* One year of art history or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

357. History of Photography

Examines a history of photography from its origin to the present, including both documentary and artistic approaches; considers relationships with other arts. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

391. Topics in Art History

Variable content; consult the *Timetable* for current topics. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated as topics vary.

401. Seminar in Chinese Art

Same as EALC 401. Investigation of selected phases, concepts, and problems of the art of China; intensive reading and reports. *Prerequisite:* ARTHI 301 or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

415. Seminar in Ancient Art

Same as CLCIV 415. Research seminar in subject selected from the art and architecture of the ancient period. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

420. Seminar in Classical Archaeology

Same as CLCIV 420. See CLCIV 420.

422. Studies in Medieval Art

Research seminar in subjects selected from the art and architecture of the medieval period. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

430. Seminar in Italian Renaissance Art

Special problems in the history of Italian Renaissance art. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

431. Studies in Northern Renaissance Art

Research seminar in subjects selected from the art of the Northern Renaissance. *Prerequisite:* Graduate standing and consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

435. Seminar in Baroque Art

Research seminar in problems selected from the art of seventeenth-century Europe. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

440. Seminar in the Art of the Period 1750-1900

Intensive study of selected problems in European art. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

441. Seminar in Modern Art

Investigation of special problems in the history of twentieth-century art. Students present reports of their research. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

446. Seminar in Contemporary Art

Intensive study of selected problems or artists. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

450. Seminar in American Art

Investigation of selected problems in the history of American art. *Prerequisite:* ARTHI 350 and 351, or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

468. Art Museum Internship

Introduction to actual supervised practice in one specialized department in an art museum: curatorial, educational, or administrative department. *Prerequisite:* ARTHI 466 and 467. 1 unit.

492. Individual Readings in the History of Art

Directed readings in special fields or aspects of history of art not provided in depth by the current course offerings. *Prerequisite:* Consent of instructor. Sections A and B may be taken simultaneously. $\frac{1}{2}$ to 1 unit. Registration allowed for each section is $\frac{1}{2}$ to 1 unit.

493. Theory and Methodology

Investigation of the theory and practice of art history as a discipline. Discussions address historiographical and methodological issues and include both traditional and recent approaches to the discipline. *Prerequisite:* Graduate level or consent of instructor. 1 unit.

499. Thesis Research

Guidance in research and writing theses for advanced degrees. *Prerequisite:* Graduate standing in art history. 0 to 4 units.

Industrial Design (ARTID)

133. Design Workshop, I

Design issues affecting contemporary culture and aesthetic perceptions. *Prerequisite:* ARTGP 121 and 122, or equivalent. 3 hours.

134. Design Workshop, II

Bionics, value adding, human factors, as they affect contemporary culture and design movements. *Prerequisite:* ARTID 133. 3 hours.

135. Model Making, I

Links practical experience of model-making with basic instruction in machines. Focuses on model-making and prototype construction and exploring the materials and techniques of soft model-making and methods of finishing and surface effects on wood, metals, and plastics. *Prerequisite:* Sophomore standing in Industrial Design or consent of instructor. 3 hours.

136. Model Making, II

Focuses on model-making techniques and methods of machining and finishing applications primarily in metals and plastics. *Prerequisite:* Sophomore standing in Industrial Design; ARTID 135 or consent of instructor. 3 hours.

210. Design Methods, I

Various Industrial design methods will be reviewed and applied to design problems in individual and group projects. *Prerequisite:* Sophomore standing in Industrial Design or consent of instructor. 2 hours. May be repeated.

211. Design Methods, II

Includes models of the designer, design methods and design process. Emphasis will be on cross-disciplinary research in methodology and integration into Industrial Design. *Prerequisite:* Junior standing in Industrial Design, ARTID 210, and consent of instructor. 2 hours.

270. Drawing and Rendering

Perspective drawing using color pastels, markers, and other media with emphasis on quick delineation. *Prerequisite:* Concurrent registration in ARTID 275, 276, 277, or 278; or consent of instructor. 2 hours. May be repeated to a maximum of 4 hours.

271. Materials and Processes, I

Provides an introduction to materials and processes used in industrial design. *Prerequisite:* Sophomore standing in Industrial Design or consent of instructor. 2 hours.

272. Materials and Processes, II

Continuation of ARTID 271. *Prerequisite:* ARTID 271. 3 hours.

275. Industrial Design, I

Designing of objects for manufacture by the machine industries. *Prerequisite:* Junior standing in Industrial Design curriculum or consent of department. 3 hours. Field trip required.

276. Industrial Design, II

Continuation of ARTID 275. *Prerequisite:* ARTID 275. 3 hours. Field trip required.

277. Advanced Industrial Design, I

Prerequisite: ARTID 276. 4 hours.

278. Advanced Industrial Design, II

Prerequisite: ARTID 277. 4 hours.

280. Professional Practices

Focuses on the preparation of a design portfolio and resume; examines operations of professional design offices; and includes presentations and discussions by visiting designers. 2 hours.

290. Senior Honors in Industrial Design

Independent creative activity, guided study, or research for honors. *Prerequisite:* Senior standing in Industrial Design, a cumulative grade point average of 3.0; and consent of instructor, adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Industrial Design Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in Art and Design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

371. Computer Applications in Design, I

Concepts, methods, and current applications of computer-aided industrial design (CAID) will be studied, using autocad and other software. *Prerequisite:* Junior standing in Industrial Design or consent of instructor. 3 hours or 1 unit.

372. Computer Applications in Design, II

Continuation of ARTID 371 with emphasis on applying computer applications programs to solving product, graphic, and communications problems in design; uses of networking and high quality output devices (plotters, printers, and video media). *Prerequisite:* ARTID 371 or consent of instructor. 2 hours or ½ unit.

475. Industrial Design, I

Introductory graduate-level course emphasizes in-depth design research used to evaluate set studio projects. Focuses on the development of critical thinking and product evaluation, and the development of inherent skills required to communicate that thinking through designed artifacts. This course is the first level of a six-semester study in a three-year program leading to a terminal degree of MFA in Industrial Design. *Prerequisite:* BFA in Industrial Design or a related field (as accepted by the faculty), or consent of instructor. 1½ units.

476. Industrial Design, II

Second semester of the introductory level year of the Industrial Design MFA degree program. *Prerequisite:* ARTID 475. 1½ units.

477. Industrial Design Laboratory, III

Start of the second level of a six-semester study in a three-year program leading to a terminal degree of MFA in Industrial Design. *Prerequisite:* ARTID 476. 1½ units.

478. Industrial Design Laboratory, IV

Completion of the second level of a six-semester study in a three-year program leading to a terminal degree of MFA in Industrial Design. *Prerequisite:* ARTID 477. 1½ units.

479. Industrial Design Laboratory, V

Beginning of the third year of six-semester study in a three-year program leading to a terminal degree of MFA in Industrial Design. Emphasis is solely directed to a research and design project accompanied by a comprehensive written statement. *Prerequisite:* ARTID 478. 1½ units.

480. Industrial Design Laboratory, VI

Final semester of a three-year program leading to a terminal degree of MFA in Industrial Design. Emphasis is solely directed to a research and design project accompanied by a comprehensive written statement. *Prerequisite:* ARTID 479. 1½ units.

491. Special Problems in Industrial Design

Directed individual creative activity or design. *Prerequisite:* Graduate standing in Industrial Design. ½ to 2 units. May be repeated to a maximum of 8 units.

Art Painting (ARTPA)**125. Life Drawing, I**

Prerequisite: ART&D 118. 2 hours.

126. Life Drawing II

Prerequisite: ARTPA 125. 2 hours.

141. Beginning Painting I

Introductory course in oil and acrylic painting. Painting is primarily observational. Literal representational content is varied. The processes and fundamentals of the craft of painting are explored, emphasizing the developments of creative pictorial aesthetics. *Prerequisite:* Freshman standing in Art and Design. 3 hours.

142. Figure Painting I

The process and fundamentals of painting are explored as applied to representational and interpretive painting of the human figure. *Prerequisite:* ARTPA 125, 141, or consent of instructor. 3 hours.

143. Painting, Materials and Methods

Problems of nonliteral content for painters, with special consideration of materials and techniques. *Prerequisite:* ART&D 118 and 120. 2 hours.

144. Painting, Issues, and Methods

Continuation of ARTPA 143 with special emphasis on formal organization in Painting. *Prerequisite:* ARTPA 143. 2 hours.

201. Watercolor, I

Prerequisite: ART&D 118 and 120. 2 hours.

219. Current Art Issues Seminar

Seminar with readings, lectures, discussions on ideas and issues affecting contemporary art. Attendance is required at visiting artists' and scholars' lectures and field trips. *Prerequisite:* Junior standing in fine and Applied Arts or consent of instructor. 2 hours. May be repeated to a maximum of 6 hours.

225. Intermediate Drawing and Painting, I

Explores the interrelationship of drawing and painting. *Prerequisite:* ARTPA 126 and 142, and junior standing in Painting. 3 hours.

226. Intermediate Drawing and Painting, II

Continues the exploration of the interrelationship of drawing and painting. *Prerequisite:* ARTPA 225, and junior standing in Painting. 3 hours.

231. Intermediate Painting, I

Prerequisite: ARTPA 126, 142, and 144, and junior standing in Painting. 3 hours.

232. Intermediate Painting, II

Prerequisite: ARTPA 231, and junior standing in Painting. 3 hours.

233. Advanced Painting, I

Prerequisite: ARTPA 226 and 232, and senior standing in Painting. 3 hours.

234. Advanced Painting, II

Prerequisite: ARTPA 233, and senior standing in Painting. 3 hours.

245. Advanced Painting Studio, I

Advanced creative study from nature and the model in various painting and drawing media. *Prerequisite:* ARTPA 226 and 232, and senior standing in Painting. 3 hours.

246. Advanced Painting Studio, II

Advanced creative study and research in various painting and drawing media, individual

exhibition, documentation of work, statement of aesthetic objectives. Visiting critic/artist and staff critique student art. *Prerequisite:* ARTPA 245, and senior standing in Painting. 3 hours.

290. Senior Honors in Painting

Independent creative activity, guided study, or research for honors. *Prerequisite:* Senior standing in painting, a cumulative grade point average of 3.0; and consent of instructor, adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Painting Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in Art and Design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

335. Computer Imaging

Fine arts approach to computer imaging for students in painting, printmaking, sculpture and related fields; no previous computer experience is necessary. *Prerequisite:* Sophomore standing or consent of instructor. 2 hours or ½ unit. May be repeated to a maximum of 4 hours or 1 unit.

380. Drawing

Advanced drawing in several media. *Prerequisite:* For undergraduates, consent of instructor; for graduates, consent of departmental graduate committee. 2 hours, or ½ to 1 unit.

381. Painting

Advanced painting in oil and other media. Not open to candidates for the MFA in Painting. *Prerequisite:* For undergraduates, ARTPA 142 or equivalent; for graduates, consent of departmental graduate committee. 2 to 4 hours, or ½ to 1 unit. May be repeated to a total of 2 units.

382. Painting Materials and Techniques

Study of the materials and techniques used in the various media: oil, watercolor, tempera, gouache, encaustic, etc. *Prerequisite:* ARTPA 142 or graduate standing in Art. 2 hours or ½ unit.

491. Special Problems in Painting and Drawing

Directed individual creative activity or research. *Prerequisite:* Graduate standing in Painting. ½ to 2 units. May be repeated to a maximum of 5 units.

495. Painting Laboratory

Professional and experimental painting with emphasis on the development of maturity of style and personal expression. *Prerequisite:* Enrollment in the MFA program in Painting. ½ to 3 units.

Photography (ARTPH)

115. Basic Photography

Investigates basic elements comprising a photograph; explores the photogram, tone, and texture as expressive media; and works with the camera, exposure meter, and film and print developing in black and white. See *Timetable*

for average cost; student must furnish camera. *Prerequisite:* Freshman standing in Art and Design; or consent of instructor. 3 hours.

215. Photography, II

Uses hand held cameras (35mm and 2¼") and black and white processes to express ideas and emotions with emphasis on the development of a personal aesthetic. See *Timetable* for average cost; student must furnish camera. *Prerequisite:* ARTPH 115. 3 hours.

216. View Camera and Studio

Includes work with camera movements, black and white exposure, and development relationships as tools of creative expression; covers basic lighting techniques and studio procedures. Most equipment furnished. *Prerequisite:* ARTPH 215, or consent of instructor. 3 hours.

220. Color Photography

Explores the potential of color prints and transparencies as media for creative expression. See *Timetable* for average cost; student must furnish camera. *Prerequisite:* ARTPH 115. 3 hours.

291. Individual Photography Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in Art and Design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

315. Photography, III

Explores creative expression through the medium of photography. Students select format and process (i.e., black and white, color, mixed media) based on prior experience; group critiques held frequently; initial opportunity to experiment in personally selected directions which will be refined and amplified in ARTPH 316. *Prerequisite:* Junior standing in Photography or consent of instructor. 3 hours or ¾ units. May be repeated to a maximum of 12 hours or 3 units.

316. Advanced Photography

Concentrated use of photographic processes for creative expression with emphasis on professionalism and the production of a photographic portfolio. *Prerequisite:* Senior standing in Photography, or consent of instructor. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 1½ units.

330. Alternative Processes

Explores cyanotype, Van-Dyke Brown, Bichromate Printing and other historical processes. Additional work will utilize offset lithography and electrostatic equipment. *Prerequisite:* Two art photography courses including ARTPH 215, or consent of instructor. Background in drawing, design, and art history courses will be expected. 3 hours or 1 unit.

331. Digital Photography

Problem solving using digital photographic technology. Projects will include the production of slides and/or video with additional graphic arts techniques, electrostatics and computer typesetting. *Prerequisite:* Junior standing in Photography, or consent of instructor. 3 hours or 1 unit.

350. Photography Seminar

Advanced study of photographic issues and literature. Discusses aesthetics, criticism, and current imagery, as well as photography's relationship to other media. *Prerequisite:* Junior standing in Photography, or consent of instructor. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 1½ units.

360. Video for Artists, I

Explores the potential of video as a medium for creative expression and communications within the context of visual art. See current *Timetable* for average student materials cost; camera, recording, and editing equipment are furnished. *Prerequisite:* Junior standing in Art; ARTPH 115 or consent of instructor. 3 hours, or ¾ or 1 unit.

361. Video for Artists, II

Explores advanced concepts and techniques of video as a medium of creative expression and communication within the context of visual art. See current *Timetable* for average student material cost; camera, recording, and editing equipment are furnished. *Prerequisite:* ARTPH 360. 3 hours, or ¾ or 1 unit.

398. Photography Workshop

Advanced course on a special topic: see *Timetable* section note for description. *Prerequisite:* Junior, senior or graduate standing in art and design; or consent of instructor based upon announced criterion that varies with topic. 3 hours or 1 unit.

486. Photography Studio

Individually directed research; personal expression through the photographic medium. *Prerequisite:* Enrollment in MFA program and major in Photography, or consent of the departmental graduate committee. ½ to 2 units. May be repeated.

491. Special Problems in Photography

Directed individual creative activity or research. *Prerequisite:* Graduate standing in Photography. ½ to 2 units. May be repeated to a maximum of 5 units.

Printmaking (ARTPR)

271. Beginning Etching

Introductory course in intaglio printmaking, including the complete image development from sketch to printing stages. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

272. Intermediate Etching

Intermediate course in intaglio printmaking, including the complete development from sketch to printing stages. *Prerequisite:* ARTPR 271. 3 hours.

281. Beginning Lithography

Studio course in lithography comprised of black and white printing primarily from stones. Work includes the complete development of a lithographic print from idea to the final print. *Prerequisite:* Sophomore standing in Art and Design or consent of instructor. 3 hours.

282. Intermediate Lithography

Studio course in lithography comprised of black and white and multiple color printing from both stones and metal plates. Work includes the complete development of a lithographic print from idea to the final print. *Prerequisite:* ARTPR 281. 3 hours.

291. Individual Printmaking Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in Art and Design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

371. Advanced Etching

Advanced course in intaglio printmaking, including the complete image development from sketch to printing stages. *Prerequisite:* ARTPR 271 and 272. 3 hours, or $\frac{1}{4}$ to 1 unit.

381. Lithography

Laboratory course in lithography. Course of study includes a complete development of the process, exploiting its potential as a fine art medium. *Prerequisite:* For undergraduates, ARTPR 282; for graduates, consent of departmental graduate committee. 2 hours, or $\frac{1}{2}$ to 1 unit.

491. Special Problems in Printmaking

Directed individual creative activity or research. $\frac{1}{2}$ to 2 units. May be repeated to a maximum of 5 units.

497. Print Workshop

Intaglio, relief, and planographic print media; includes etching, engraving, aquatint, wood, paper, and plastic relief printing, and lithography. *Prerequisite:* Graduate standing in Art. $\frac{1}{2}$ to 3 units.

Sculpture (ARTSC)**151. Sculpture, I**

Exploration of basic sculptural ideas and techniques including construction, modeling, carving, and casting, and the use of sculptural media such as wood, plaster, plastics, and clay. The elements of three-dimensional design and composition will also be emphasized. *Prerequisite:* Sophomore standing, or consent of instructor. 3 hours.

152. Sculpture, II

Theory, techniques, and formal principles of wood sculpture, including carving and constructions; metal sculpture; including welding, forming, and finishing and related concepts and techniques in mixed-media sculpture. *Prerequisite:* ARTSC 151. 3 hours.

219. Current Issues in Sculpture, Glass, and Ceramics

Through seminar interaction, visiting lecturers, and visits to studios, students become familiar with skills and sensibilities necessary for a professional artist. The seminars will be augmented with reading, lectures, discussions on ideas and issues affecting contemporary art. *Prerequisite:* Junior standing in Art and Design, or consent of instructor. 3 hours. May be repeated to a maximum of 6 hours.

230. Figure Modeling

Life sculpture: three-dimensional study of human, animal, and other forms found in nature. Three-dimensional portraiture and representational bas relief sculpture. Study of representational sculpture on campus and in surrounding communities. *Prerequisite:* Consent of instructor. 3 hours.

253. Intermediate Sculpture, I

A free, experimental, and creative use of permanent and impermanent sculpture materials; clays, wood, pastelines, and plasters. *Prerequisite:* ARTSC 152. 2 hours.

254. Intermediate Sculpture, II

Special projects in stone carving and malleable sheet metal; lead, copper, brass, and aluminum. *Prerequisite:* ARTSC 253. 2 hours.

255. Sculpture Materials and Techniques, I

Special projects for cast bronze; model preparations, investments, melting, pouring, chasing, and developing of patinas. *Prerequisite:* ARTSC 152; junior standing in curriculum in Sculpture. 3 hours.

256. Sculpture Materials and Techniques, II

Special projects in terra cotta; use of various clays; preparation and construction methods; special problems in casting methods and materials; kiln operation; fuels; and glazing. *Prerequisite:* ARTSC 255. 3 hours.

257. Advanced Sculpture, I

Introduction to plastics and welded metals; projects utilizing the special qualities of these materials. *Prerequisite:* ARTSC 254. 2 hours.

258. Advanced Sculpture, II

Projects in permanent materials; special attention given to the relation of sculpture to the allied fields of architecture and landscape architecture. *Prerequisite:* ARTSC 257. 2 hours.

259. Advanced Sculpture Materials and Techniques, I

Projects in various permanent materials; special attention given to the relation of sculpture to the allied fields of architecture and landscape architecture. *Prerequisite:* ARTSC 256. 3 hours.

260. Advanced Sculpture Materials and Techniques, II

Continuation of ARTSC 259. *Prerequisite:* ARTSC 259. 3 hours.

290. Senior Honors in Sculpture

Independent creative activity, guided study, or research for honors. *Prerequisite:* Senior standing in Sculpture, a cumulative grade point average of 3.0; and consent of instructor, adviser, and associate director of the School. 2 to 5 hours. May be repeated to a maximum of 5 hours.

291. Individual Sculpture Problems

Directed independent creative activity or research. *Prerequisite:* Junior standing in Art and Design; and consent of instructor, adviser, and associate director of the School. 1 to 4 hours. May be repeated to a maximum of 6 hours.

391. Advanced Sculpture Techniques

Advanced work in various sculptural media. *Prerequisite:* Consent of instructor. 2 hours, or $\frac{1}{2}$ to 1 unit.

491. Special Problems in Sculpture

Directed individual creative activity or research. *Prerequisite:* Graduate standing in sculpture. $\frac{1}{2}$ to 2 units. May be repeated to a maximum of 5 units.

496. Sculpture Laboratory

Experience at a professional level in sculptural techniques including metals casting, welding, stone carving, wood carving, clay modeling, and ceramic sculpture, with emphasis on the development of creative achievement. *Prerequisite:* Enrollment in the MFA program in Sculpture or consent of departmental graduate committee. 1 to 3 units.

ART EDUCATION

(See Art and Design, School of)

ASIAN STUDIES

(See East Asian Languages and Cultures)

ASTRONOMY

Chair of Department: Richard M. Crutcher
Department Office: 103 Astronomy Building,
1002 West Green Street, Urbana
Phone: 333-3090
URL: www.astro.uiuc.edu

Astronomy (ASTR)

100. Perspectives in Astronomy

One-semester introduction to astronomy. The nature of science; sun, planets, and moons; origin of the solar system; nature and evolution of stars; exploding stars; stellar remnants, including dwarfs, neutron stars, and black holes; molecules in space; galaxies and quasars; past and future of the universe; and life in the universe. Lectures and observation; a field trip to Parkland Staerckel Planetarium may be required, nominal charge. 3 hours. Credit is not given to students with credit in ASTR 121 or 122; not open to students with

credit in PHYCS 102, 112, or equivalent. Students with credit in PHYCS 111 are encouraged to take ASTR 210.

113. The Sky

Examines the visual aspects and phenomena of the sky; astronomical lore and history. *Prerequisite:* ASTR 100, 121 or 122, or consent of instructor. 3 hours.

121. The Solar System

Introductory survey of the universe; structure and motions of the earth and moon; planetary motions; physical nature of the planets; comets and meteors; origin and evolution of the solar system. Emphasis will be placed on problem-solving and scientific methods. Two lectures and one discussion each week, and observing sessions during the semester. Intended for nonscience majors; science and Astronomy majors should take ASTR 210. 3 hours. Credit not given to students with credit in ASTR 100 or 210 or GEOL 116; or in PHYCS 112 or higher-level Physics course. Students with credit in PHYCS 111 are encouraged to take ASTR 210.

122. Stars and Galaxies

Introduction to astrophysical objects and phenomena beyond the solar system, and the governing basic physical principles; galaxies, quasars, and structure of the universe; cosmology; the Milky Way; the interstellar medium and the birth of stars; distances, motions, radiation, structure, evolution, and death of stars, including neutron stars and black holes. Emphasis will be placed on problem-solving and scientific methods. Two lectures and one discussion each week, and observing sessions during the semester. Intended for nonscience majors; science and Astronomy majors should take ASTR 210. 3 hours. Credit not given to students with credit in ASTR 100 or 210, or in PHYCS 112 or higher-level physics course. Students with credit in PHYCS 111 are encouraged to take ASTR 210.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

210. General Astronomy

Survey of modern astronomy for students with background in physics. Topics include: the solar system; nature and evolution of stars; white dwarfs, neutron stars, and black holes; galaxies, quasars and dark matter; large scale structure of the universe; the Big Bang; and Inflation. Emphasis will be on the physical principles underlying the astronomical phenomena. *Prerequisite:* Credit or concurrent enrollment in PHYCS 113 and 114. 3 hours. Credit is not given to students who have credit in ASTR 100, 121, or 122.

230. Extraterrestrial Life

Scientific discussion of the search for extraterrestrial life. Topics include: cosmic evolution (protons to heavy elements to molecules); terrestrial evolution (chemical, biological, and cultural); high technology searches for extraterrestrial life in the solar system (Mars, Venus, outer planets); and beyond the solar system (Drake equation and current SETI projects). *Prerequisite:* ASTR 100, 121, 122, or 210; or consent of instructor. 3 hours.

250. Introduction to Cosmology

Descriptive course on modern cosmological theories. Topics include aspects of special and general relativity; curved spacetime; the Big Bang; inflation; primordial element synthesis; the cosmic microwave background; the formation of galaxies and large scale structure. *Prerequisite:* ASTR 100, or 121, or 122, or 210, or consent of instructor. 3 hours.

290. Individual Study

Individual study at an advanced undergraduate level. *Prerequisite:* Consent of adviser and of staff member who supervises the work. 1 to 4 hours.

301. Scientific Writing for Astronomers

Development of journal-style writing skills. Papers written in accordance with the Astrophysical Journal Manual of Style on topics approved by the instructor. Emphasis on developing adequate and critical coverage of the topic, brevity compatible with clarity, and effective presentation. Proper referencing, footnotes, and bibliography are covered. *Prerequisite:* Concurrent enrollment in a designated 300-level astronomy course. 1 hour or ¼ unit.

304. Astrophysics, I

Introduction to astrophysical problems, with emphasis on underlying physical principles; includes the nature of stars, equations of state, stellar energy generation, stellar structure and evolution, astrophysical neutrinos, binary stars, white dwarfs, neutron stars and pulsars, and novae and supernovae. *Prerequisite:* PHYCS 113 or 114; or consent of instructor. 3 hours or 1 unit. Graduate students in Astronomy will not receive credit in ASTR 304.

305. Astrophysics, II

Introduction to astrophysical problems; includes fundamentals of solar system astrophysics, elements of physical cosmology, and such additional topics as galactic nuclei, quasars, cosmic ray nuclei, the interstellar medium, and cosmic electrodynamics. *Prerequisite:* PHYCS 113 or 114; or consent of instructor. 3 hours or 1 unit. Graduate students in Astronomy will not receive credit in ASTR 305.

314. Astronomical Techniques

Introduction to techniques used in modern optical and radio astronomy with emphasis on the physical and mathematical understanding of the detection of electromagnetic radiation; includes such topics as fundamental properties of radio and optical telescopes and the detectors that are used with telescopes. Lectures and laboratory. *Prerequisite:* MATH 242 or 245; PHYCS 113 or 114; or consent of instructor. ASTR 210 is recommended. 4 hours or 1 unit. Graduate students in Astronomy will not receive credit for ASTR 314.

321. Galactic Astronomy

Galactic structure: the observational data; stars in the solar neighborhood; the solar motion; stellar statistics and distribution; stellar populations; interstellar matter and spiral structure; and the whole galaxy. *Prerequisite:* ASTR 210, 305, or both 121 and 122, or consent of instructor. 3 hours or 1 unit.

322. Extragalactic Astronomy

Overview of current physical understanding of the large-scale structure, contents, and evolution of the universe; includes such topics as the properties of galaxies, quasars, clusters and superclusters of galaxies, the microwave background radiation, origin and evolution of galaxies, and observational cosmology. *Prerequisite:* ASTR 305 or consent of instructor. 3 hours or 1 unit.

333. Solar System Astrophysics

Same as GEOL 333. Planetary orbits and perturbations; physical perturbations; physical parameters of the planets; planetary interiors, atmospheres, magnetospheres, and surface layers; the satellites; asteroids and comets; meteors, meteorites, and tektites; interplanetary grains and gas; and problems of origin and evolution. *Prerequisite:* PHYCS 113 or 114 or consent of instructor. 3 hours or 1 unit.

350. Introduction to Geophysics

Same as GEOL 350. See GEOL 350.

396. Seminar in Astronomy

Lectures on topics of current interest in astronomy and astrophysics; for advanced undergraduates and graduates. See *Timetable* for current topics. *Prerequisite:* Consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated.

401. Stellar Atmospheres

Physical characteristics of stellar atmospheres as derived from spectroscopic observations; radiation transfer; theory and observations of the continuous spectrum; limb darkening; formation of absorption lines; line profiles; curves of growth; relative chemical abundances; and emission features. *Prerequisite:* Consent of instructor. Desirable background includes some familiarity with atomic physics, advanced calculus, and general astronomy. 1 unit.

402. Theoretical Astrophysics

Application of physical principles to a broad selection of topics in astrophysics: fluid dynamics in an astrophysical context; equilibria and collapse of interstellar clouds; star formation; shock waves, ionization fronts, winds, and accretion and jets; stellar structure, evolution, and nucleosynthesis; white dwarfs, neutron stars, pulsars, and compact x-ray sources; dynamics of stellar systems and spiral structure; cosmic electrodynamics, including continuum radiation mechanisms, cosmic rays, and radio galaxies; cosmology; galaxy formation; and quasars. Emphasis on the underlying physics rather than on detailed factual description. *Prerequisite:* PHYCS 336, 361, and 386; or consent of instructor. 1 unit.

403. Observational Astronomy

Techniques and basic results of observational astronomy; gamma ray, x-ray, ultraviolet, visible, infrared, and radio astronomy; data handling; coordinate systems, time, astrometry; detectors; telescopes; imaging; photometry; spectroscopy; polarimetry. *Prerequisite:* Consent of instructor. 1 unit.

404. Stellar Structure and Evolution

Same as PHYCS 404. Relationship between observable features of stars and the physical processes that occur in their interiors; topics include matter and radiation in stars (equa-

tions of state, modes of energy flow, nuclear energy production, and element synthesis); structure of stars during all phases prior to the supernova or planetary nebula stage; stellar pulsations with reference to Cepheids and RR Lyrae variables; and properties of white dwarfs, neutron stars, and contact binaries. *Prerequisite:* PHYCS 361 and 382, ASTR 402, or consent of instructor. 1 unit.

405. Diffuse Matter Astrophysics

Same as PHYCS 405. Interstellar gas: balance of microscopic processes, large scale structure, interaction with stars, dynamics, heating, ionization, and cooling; continuous and discrete radiation processes, excitation mechanisms, propagation of radiation, molecule formation, dust grains, star formation, magnetic fields, and cosmic rays. *Prerequisite:* Consent of instructor. 1 unit.

406. The Physics of Compact Objects

Same as PHYCS 406. See PHYCS 406.

407. Radiation Hydrodynamics

Dynamics of radiating fluids, i.e., fluids in which radiation dominates energy and/or momentum transport in the flow; emphasis on underlying physical principles with examples from astrophysics; numerical methods. *Prerequisite:* ASTR 401 or consent of instructor. Familiarity with basic concepts of radiation transport, fluid mechanics, and tensors desirable. 1 unit.

490. Individual Study

Individual study or nonthesis research. *Prerequisite:* Consent of adviser and of staff member who supervises the work. 2 to 2 units. May be repeated to a maximum of 4 units.

496. Seminar in Special Topics

Prerequisite: Consent of instructor. 0 to 4 units. May be repeated.

499. Thesis Research

0 to 4 units.



ATMOSPHERIC SCIENCES

Acting Head of Department: Robert Wilhelmson
Department Office: 101 Atmospheric Sciences Building, 105 South Gregory Drive, Urbana
Phone: 333-2046
URL: www.atmos.uiuc.edu

Atmospheric Sciences (ATMOS)

100. Introduction to Meteorology

Introduces the student to the basic concepts and principles of atmospheric science in a descriptive format; emphasizes the physics responsible for changes in the weather; uses current weather information to illustrate textbook material. 3 hours.

120. Severe and Unusual Weather

Most extreme manifestations of weather and climate are analyzed in terms of their physical basis and their historical, economic and human consequences. Emphasis is placed on the interplay between technological advances, the evolution of meteorology as a science, and the impacts of extreme weather (winter storms, floods, severe thunderstorms, hurricanes, El Niño). Technological advances include satellites, weather radars and profilers, and computer models used for weather prediction. 3 hours.

130. Illinois in the Changing Earth System

Same as GEOG and GEOL 130. Introduction to the role of interacting physical, biological, and human processes of the global Earth System in shaping the past, present, and future environment in Illinois. Intended for nonspecialists in science. Addresses how the environment of Illinois has been influenced by past climates, and how our environment may change as the climate changes in the future. The implications for Illinois of efforts to deal with local and global environmental problems are discussed, as well as the global forces that have created geological resources and geological hazards in Illinois. 3 hours.

140. Climate and Global Change

Introduces climate change and its interactions with the global environment; surveys the physical, chemical, biological and social factors contributing to global change; includes topics such as greenhouse warming, acid rain, ozone depletion, regional drought and nuclear winter; distinguishes anthropogenic influences and natural variability of the earth system; addresses societal impacts, mitigation strategies, policy options and other human responses to global change. *Prerequisite:* A 100-level course in atmospheric science or chemistry or consent of instructor. 3 hours.

199. Undergraduate Open Seminar

Special topics each semester. 1 to 5 hours. May be repeated.

222. Weather Processes

Introduction to the mean state of the atmosphere, the fundamental physics of weather processes, and the mechanisms producing daily weather changes, both qualitative and quantitative in nature. *Prerequisite:* MATH 242. 3 hours.

301. Principles of Atmospheric Physics

Quantitative introduction to atmospheric thermodynamics, cloud physics, and radiative transfer; topics include the structure, stability, and energy balance of the atmosphere, and the formation of clouds and precipitation. *Prerequisite:* MATH 242 or 245; consent of instructor. 4 hours or 1 unit.

302. Principles of Atmospheric Dynamics

Same as PHYCS 302. Introduction to those elements of fluid dynamics and thermodynamics essential to understanding the large- and small-scale motions of the neutral atmosphere. *Prerequisite:* MATH 280; consent of instructor. 4 hours or 1 unit.

303. Weather Analysis and Forecasting

Course provides the student with the necessary skill to conceptualize the structure and dynamics of the atmosphere through interpretation and analysis of weather charts, time and cross sections, soundings, and forecast products. Students develop case studies of weather system structure, participate in discussions of weather processes as depicted by weather maps, and learn techniques of forecasting weather. The depiction of atmospheric kinematic and dynamic processes on weather charts is emphasized. Students learn conceptual models of the structure of mid-latitude cyclones and convective weather systems, including cyclogenesis, frontogenesis, the process of storm intensification, occlusion and frontolysis. Numerical weather prediction models and statistical forecasting techniques are reviewed and utilized. *Prerequisite:* ATMOS 222, or consent of instructor. 4 hours or 1 unit.

312. Radar Meteorology

Basic principles of radar and references to other ground based remote sensing systems, with emphasis on radar. Discusses principles of conventional and Doppler radar, data processing, and use of Doppler radar in meteorology. Emphasizes radar observations of meteorological phenomena, such as severe thunderstorms and wind shear. Students analyze data from national radar facilities. *Prerequisite:* ATMOS 222 or consent of instructor. 4 hours or 1 unit.

313. Satellite Remote Sensing

Review of the basic techniques used in satellite remote sensing of the Earth's surface and atmosphere, as well as other planets in our solar system. Topics include radiative transfer, scattering and absorption processes, the Sun, mathematics of inversion, atmospheric properties and constituents, surface properties, precipitation, radiation budgets, image classification, satellite technology and orbital configurations. Laboratory work on radiative transfer modeling and satellite data analysis is emphasized. All students participate in a team project that has novel and practical applications. *Prerequisite:* MATH 242 or 245, or equivalent. 4 hours or 1 unit.

314. Tropical Meteorology

Course covers the basic synoptic and dynamic meteorology of the tropics and the unique characteristics of the tropical motion. Unique tropical phenomena such as hurricanes, El Niño, monsoons, intraseasonal oscillations, easterly waves, and quasi-biennial oscillations are discussed. *Prerequisite:* ATMOS 222 or consent of instructor. 4 hours or 1 unit.

381. Modeling Earth and Environmental Systems

Same as GEOG and GEOL 381. Introduction to systems modeling with applications to the earth and environmental sciences. Basic systems concepts and systems thinking in the contexts of hydrological, climatic, geochemical, and other environmentally relevant systems. Students identify key processes and relationships in systems, represent these elements quantitatively in models, test the models, use them to predict system behavior,

and assess the validity of the predictions. No special mathematical or computing background is required. *Prerequisite:* Junior or graduate standing in a natural science, geography, natural resources and environmental studies, or engineering. 4 hours or 1 unit.

390. Individual Study

Individual study or reading at an advanced undergraduate level in a subject not covered in normal course offerings. *Prerequisite:* Consent of adviser and of staff member supervising work. 1 to 4 hours, or ¼ to 1 unit. May be repeated to a maximum of 8 hours or 2 units. May not be used to satisfy requirements for an M.S. or Ph.D. degree in Atmospheric Sciences.

397. Topics in Atmospheric Sciences

Special topics in atmospheric sciences at an advanced undergraduate level. *Prerequisite:* Advanced undergraduate standing and consent of instructor. 2 to 4 hours, or ½ to 1 unit.

401. Synoptic Meteorology

Examines the observed behavior of the atmosphere through the application of physical and hydrodynamical principles to analyses of real meteorological data; develops concepts for studying atmospheric circulations, particularly extratropical cyclones and anticyclones. Laboratory work includes the development of diagnostic techniques suitable for a better understanding of the current weather. *Prerequisite:* ATMOS 301 and 302. 1 unit.

402. Mesoscale Meteorology

Basic concepts and ideas on atmospheric processes that occur on scales of motions from a few kilometers to a few hundred kilometers, a scale loosely classified by meteorologists as "mesoscale". After an introductory discussion of mesoscale classifications and attendant forecast problems, the course will introduce various mesoscale phenomena, internally generated circulations, externally forced circulations, and mesoscale instabilities. Covers all three fundamental aspects of mesoscale meteorology: observations, theory and modeling, with particular emphasis on the dynamics of precipitating mesoscale systems. *Prerequisite:* ATMOS 301 and 302. 1 unit.

405. Numerical Methods in Fluid Dynamics

Same as CSE 466 and CS 405. Intended to give the student practical numerical techniques for solving those linear and nonlinear differential equations which appear frequently as initial and boundary value problems in hydrodynamics and dynamic meteorology. *Prerequisite:* MATH 280 or consent of instructor. 1 unit.

406. Dynamical Weather Prediction

Same as CSE 467. Describes the principles and methods of simulating and predicting large-scale atmospheric motions on the basis of hydrodynamics and thermodynamics. *Prerequisite:* ATMOS 302. 1 unit.

408. Atmospheric General Circulation

Reviews the observed general circulation of the earth's atmosphere; discusses the balance requirements of mass, momentum, and energy conservation; illustrates, by means of

mathematical models and laboratory physical models, the important processes which determine the earth's and other planets' general circulation. *Prerequisite:* ATMOS 301 or equivalent, and ATMOS 302. 1 unit.

410. Physical and Dynamical Oceanography

Basic principles underlying physical and dynamical oceanography, with an emphasis on processes affecting air-sea interaction and climate modeling; topics include the physics of sea water, water mass characteristics, static stability, diffusion, equations of motion, geostrophic currents, wind-driven circulation, thermohaline circulation, numerical models, waves, tides. *Prerequisite:* MATH 242 and ATMOS 301, or consent of instructor. 1 unit.

421. Precipitation Physics

Develops an understanding of precipitation processes through cloud observations, microphysics, dynamics, and comprehensive theoretical models; includes growth by condensation, coalescence, and riming; and studies ice crystals, hail, and weather modification. *Prerequisite:* ATMOS 301. 1 unit.

442. Global Atmospheric Modeling

Same as CSE 468. Course provides the student with training in the development, testing and application of physically based climate models. Physically based mathematical models of the earth's climate are used to study the causes of the ice ages which have occurred within a period of 100,000 years during the last two million years, the predictability of climate on the timescale of 1 to 3 months with particular attention to the worldwide El Niño phenomenon, and project the potential climatic consequences of the increasing concentrations of carbon dioxide and other greenhouse gases. *Prerequisite:* ATMOS 301 and 302, or consent of instructor. 1 unit.

451. Atmospheric Radiation

Physical concepts and various methods of analysis of radiation scattering by atmospheric molecules, particulates, and clouds; infrared radiative transfer in a stratified inhomogeneous atmosphere; radiation and ozone photochemistry in the stratosphere; and remote temperature and composition sensing techniques using satellite radiation data. *Prerequisite:* ATMOS 301. 1 unit.

461. Advanced Atmospheric Dynamics

Introduces the language and methods of modern atmospheric dynamics, covering the areas of atmospheric waves, dynamical instabilities, and wave-mean flow interactions. Emphasis is on gaining a physical understanding of atmospheric motions from planetary down to gravity wave scales, and on solving dynamical problems that arise in research. *Prerequisite:* ATMOS 302 or consent of instructor. 1 unit.

490. Individual Study

Individual study or reading in a subject not covered in normal course offerings. *Prerequisite:* Consent of instructor. ½ to 2 units.

491. Seminar in Atmospheric Sciences

Seminar on topics of current interest. *Prerequisite:* Consent of instructor. 0 to 1 unit.

497. Special Topics in Atmospheric Sciences

Lecture course in topics of current interest; subjects such as tropical meteorology, aerosol physics, and geophysical fluid dynamics will be covered in semester offerings on a regular basis. *Prerequisite:* Consent of instructor. 0 to 1 unit.

499. Thesis Research

Section A: For master's degree candidates; Section B: For doctoral degree candidates. *Prerequisite:* Consent of instructor. 0 to 4 units.

AVIATION

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Aviation (AVI)

101. Private Pilot, I

The first of a two course sequence to prepare for FAA Private Pilot certification. Includes classroom instruction on aerodynamics, airplane systems, airport and airplane operations, federal regulations and airplane safety. Also includes twenty-five hours of flight training and 6 hours in a flight simulator in the flight laboratory. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. Private Pilot certification requires the completion of AVI 120. *Prerequisite:* Consent of director. 3 hours.

102. Orientation Refresher

Course provides the student with additional aeronautical experience to develop the required proficiency to complete successfully the objectives of a flight course, pilot certificate, or aircraft rating. The flight hours may be divided between dual instruction or solo flight as required to meet the student's needs. The amount of dual vs. solo time and aircraft to be used will be determined by the chief pilot. Students enrolled in this course will also participate in up to 5 hours of research flight experiments. *Prerequisite:* Consent of director. 0 hours. May be repeated.

120. Private Pilot, II

Second of a two course sequence to prepare for FAA Private Pilot certification. Includes classroom instruction on airplane operation, navigation, night flying and meteorology. Includes thirty-six hours of flight training and 6 hours in a flight simulator in the flight laboratory. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. Students successfully completing final examinations will be issued a

Private Pilot certificate. *Prerequisite:* AVI 101 and consent of director. 3 hours. Credit is not given for both AVI 120 and 121.

121. Private Pilot, Requalification

Forty-five classroom hour transitional course for students entering the Institute with a Private Pilot certificate who desire to continue in the Commercial-instrument sequence (AVI 130 through 210/211). Includes instruction on airplane operations, navigation, and meteorology. Includes 17 hours of flight training and 3 hours in a flight simulator in the flight laboratory. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. *Prerequisite:* Private Pilot certificate (with a minimum of 60 hours of flight), and consent of director. 2 hours. Credit is not given for both AVI 120 and 121.

130. Commercial—Instrument, I

First of a two course sequence to prepare the private pilot for the instrument rating; reviews cross-country flight with an emphasis on instrument approaches and enroute instrument procedures; includes 45 hours classroom instruction on instrument flying, navigation, aircraft instruments, and regulations. Includes 27 ½ hours of flight training and 10 hours in a flight simulator in the flight laboratory. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. Issuance of the instrument rating requires completion of AVI 140. *Prerequisite:* AVI 120 or 121, and consent of director. 3 hours.

140. Commercial—Instrument, II

Second of a two course sequence to prepare the private pilot for the instrument rating. Includes forty-five hours classroom instruction on advanced maneuvers, aerodynamics, navigation, and aircraft systems. Includes 28 hours of flight training and 8 hours in a flight simulator in the flight laboratory. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. *Prerequisite:* AVI 130 and consent of director. 3 hours.

184. Aircraft Systems for Pilots

Basic aircraft systems, their components, and theory of operation. Familiarization of Federal Aviation Administration maintenance rules and regulations applicable to pilots. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Commercial Pilot, I

Advanced course in preparation toward the FAA Commercial Pilot Certificate. Includes 15 hours of flight (12 hours dual and 3 hours solo) including a 1½ hour flight exam for qualified students plus 8 hours in a flight simulator in the flight laboratory. Includes 45 hours of classroom instruction covering cross-country procedures, appropriate federal aviation regulations, maintenance inspections, and PIC responsibilities. Emphasis is on instrument flying procedures and an introduction to commercial maneuvers. Successful completion is required prior to enrolling in AVI 210 (or AVI 211). Students enrolling in this course will also participate in up to 5 hours of research flight experiments conducted by the Institute of

Aviation staff. *Prerequisite:* AVI 140 and consent of instructor. 3 hours.

210. Commercial Pilot, II

Final course in a series of advanced flight/courses in preparation for the FAA Commercial Pilot certificate with Instrument rating. Includes 45 hours classroom instruction on IFR and VFR cross-country, and VFR commercial maneuvers. Includes 28 hours of flight instruction and training (single-engine airplane) and 3 hours in a flight simulator in the flight laboratory. Students enrolling in this course will also participate in up to 5 hours of research flight experiments conducted by Institute of Aviation staff. *Prerequisite:* AVI 200 and consent of director. 3 hours. Students may not receive credit for both AVI 210 and 211.

211. Commercial Pilot, II—Multiengine

Final course in a series of advanced lecture/flight courses in preparation for the FAA Commercial Pilot certificate with both the Instrument rating and multi-engine ratings. Includes 45 hours classroom instruction on IFR and VFR cross-country, and VFR commercial maneuvers. Includes 35 hours of flight instruction and training (23 hours multi-engine airplane and 12 hours single-engine airplane) and 2 hours in a flight simulator in the flight laboratory. Includes three flight exams for qualified individuals. Students enrolling in this course will also participate in up to 5 hours of research flight experiments conducted by Institute of Aviation staff. *Prerequisite:* AVI 200, recommendation from AVI 200 instructor, and consent of director. 3 hours. Students may not receive credit for both AVI 211 and 210.

220. Flight Instructor—Airplane

Prepares the commercial pilot for an FAA Flight Instructor (Airplane) certificate. Includes 45 hours classroom instruction on fundamentals of teaching, student motivation, blocks to learning, stress, cognitive approaches to learning, flight instructor duties/responsibilities, lesson planning and development, aerodynamics, and pertinent federal aviation regulations. Includes 22 hours of flight training and instruction and three hours in flight simulator teaching techniques in the flight laboratory. Also includes a one-hour flight check for course completion. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. *Prerequisite:* Commercial Pilot certificate with instrument rating and consent of director. 3 hours.

222. Instrument Flight Instructor

Provides the instruction and supervised training for the addition of the Instrument-Airplane rating to the Flight Instructor certificate. Reviews instrument operations with an emphasis on the instructional aspects of these operations. Includes five hours of flight simulator instruction, ten hours of flight instruction and supervised training, four hours of discussion and a one hour flight test. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. *Prerequisite:* Commercial Pilot certificate with instrument rating; flight instructor-airplane certificate or concurrent

enrollment in AVI 220; and consent of director. 1 hour.

224. All Attitude Orientation

Primary focus of this course is to teach the recovery of an airplane from emergency inflight attitudes. Teaches the safe handling of an aircraft in all attitudes of flight through the use of various acrobatic maneuvers including loops, snap rolls, slow rolls, Immelmans, Cuban eights, spins, and similar maneuvers, plus takeoff and landing procedures in a tailwheel airplane. Ten flight hours. Students enrolling in this course will also participate in up to five hours of research flight experiments conducted by the Institute of Aviation staff. *Prerequisite:* AVI 101 and 120 or the Private Pilot certificate and consent of director. 0 hours.

250. Practice Teaching—Airplane

Practice teaching using classroom, audiovisual materials, flight simulators, and airplanes; prepares the certified flight instructor to teach in all modes of aviation education. A minimum of 2 hours of classroom lecture, 3 hours of simulator instruction, and from 1 to 19 hours of airplane instruction is given by the student; an additional 20 hours of classroom lecture-discussion clarifies and explains the proper methods of aviation instruction. *Prerequisite:* AVI 220 and flight instructor certificate; junior standing; recommendation from AVI 220 flight instructor; and consent of director. 3 hours.

258. Human Factors in Human-Machine Systems

Same as PSYCH 258 and I E 240. See PSYCH 258.

280. Multiengine Land

Prepares the commercial pilot for an FAA multiengine land airplane rating; 18 hours of discussion and 9 hours of flight in a multiengine airplane (7½ dual instruction, ½ solo, plus 1.0 check ride for qualified individuals). Students enrolling in this course will also participate in up to 5 hours of research flight experiments conducted by Institute of Aviation staff. *Prerequisite:* Commercial Pilot certificate and consent of director. 1 hour.

281. Cockpit Resource Management

Examines societal/cultural, industry, governmental regulatory agency, organizational, group, and individual influences on cockpit behavior and cockpit resource management. Two 90 minute lecture/discussion and one two-hour laboratory/flight periods each week. Laboratory and flight sections use multi-engine flight simulators and multi-engine aircraft. Students will gain experience flying preplanned scenarios in both aircraft and simulators. Materials from lecture/discussions will be emphasized in flights. *Prerequisite:* Multi-engine instrument rating; junior standing. 3 hours.

291. Special Ratings and/or Specialized Flight

Consists of aeronautical experience that can be used for special FAA certificates and/or ratings such as Airline Transport Pilot or Rotocraft-helicopter. Course may also be used for specialized flight such as advanced multi-

engine operations. Sixteen hours of discussion and a variable number of hours of flight instruction (dual and/or solo) to meet the individual needs of the student. Students enrolling in this course will also participate in up to five hours of research flight experiments conducted by the Institute of Aviation staff. *Prerequisite:* Pilot certificate, and consent of director. 0 hours.

292. Professional Multiengine Indoctrination

Extends the development of an advanced professional pilot student; offers an internship providing a manufacturer-equivalent school in a Cessna 310R aircraft, a crew coordination (CRM) school for passenger carrying operations, and proficiency based right-seat, second in command qualification. Students enrolling in this course will also participate in up to 5 hours of research flight experiments. *Prerequisite:* AVI 211 or equivalent, and consent of instructor. 3 hours.

293. Turboprop Pilot Orientation

Introduction to multi-engine turboprop airplane operations. Forty-five hours of lecture-discussion, and 16 hours (as pilot and co-pilot) of simulated flight in a Frasca 242T Turboprop aircraft simulator or equivalent. Includes turbine engine theory and operation, normal and emergence procedures, performance calculations, and crew coordination. *Prerequisite:* AVI 184, 280, 281, and consent of Director. 3 hours.

329. Human-Computer Interaction Laboratory

Same as PSYCH 329 and I E 349. See PSYCH 329.

342. Interactive Systems Modeling, Analysis, and Design

Same as I E 342. See I E 342.

355. Aviation Accident Investigation and Analysis

Fundamental concepts of aviation safety augmentation with emphasis on accident prevention through accident investigation, casualty reduction through crashworthy design, and safety enhancement resulting from litigation; accident investigation techniques and crash survival design factors. *Prerequisite:* AVI 101 or consent of instructor. 3 hours, or ½ or 1 unit.

356. Human Performance and Engineering Psychology

Same as PSYCH 356 and I E 346. See PSYCH 356.

395. Aviation Psychology

Same as PSYCH 395. Integrates the disciplines of psychology and aviation, discussing the relevance of the psychology of perception, cognition, learning, stress, decision making, and group processes to a variety of aviation concerns related to topics such as cockpit design, pilot error, pilot training, crew communications, and air traffic control. Field trips will be taken to laboratories at Beckman or to Willard Airport. *Prerequisite:* Introductory Psychology. An upper level course in human factors (PSYCH 258 or 356) is recommended but not required. 3 hours or ¾ unit. Aviation experience is useful but not required.

397. Special Topics in Aviation

Special topics in the field of aviation. *Prerequisite:* AVI 395 or equivalent and junior standing; or consent of instructor. 2 to 4 hours, or ½ to 1 unit. May be repeated in subsequent semesters only when separate topics are offered to a maximum of 12 hours or 3 units.

427. Engineering Psychology

Same as PSYCH 427. See PSYCH 427.

448. Cooperative Problem Solving

Same as I E 448. See I E 448.



BIOCHEMISTRY

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Biochemistry (BIOCH)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

210. Biochemistry Internship

Full-time practice of biochemical science in an off-campus industrial setting or research laboratory environment. Summary report required. *Prerequisite:* Completion of freshman year or equivalent, or consent of Director of Cooperative Education in Biochemistry. 0 hours. May be repeated in separate semesters. Approved for S/U grading.

292. Senior Thesis

Limited in general to seniors in biochemistry and chemistry. BIOCH 292 is recommended for all those who plan to do research and graduate study, and it or CHEM 292 is a prerequisite for graduation with distinction in biochemistry. Each student who desires to do thesis research must receive written permission from a member of the biochemistry faculty. Accordingly, prospective students are encouraged to contact the biochemistry staff in the semester prior to registration in this course. Students must present a thesis to receive credit in this course. Registration of 10 hours over two semesters is expected. *Prerequisite:* BIOCH 352, 353, and 355/356. 2 to 6 hours. (Counts for advanced hours in L A S.)

320. Molecular Biophysics

Same as BIOPH 320. See BIOPH 320.

338. Plant Molecular Biology

Same as PLBIO 338. See PLBIO 338.

346. Physical Biochemistry

Same as CHEM 346. Physical properties of biological macromolecules, with special emphasis on proteins and nucleic acids; the use of physical methods for the characterization of such substances. *Prerequisite:* CHEM 340 or

344, BIOCH 350 or equivalent is recommended. 3 hours or ¾ unit.

350. Introductory Biochemistry

Chemistry and metabolism of carbohydrates, lipids, proteins, nucleic acids, vitamins, and coenzymes and their relation to the regulation and processes of organisms, cells, and subcellular components. *Prerequisite:* CHEM 231 or 236, or equivalent. 3 hours or ¾ unit. Not intended for students in biochemistry curriculum. Students may not receive credit for both BIOCH 350 and the BIOCH 352-353 sequence.

352. General Biochemistry

Principles, chemistry, and methods of analysis of the composition and processes of living systems. Required for students in biochemistry curriculum. Students should not enroll in BIOCH 352 without intent to take BIOCH 353. *Prerequisite:* CHEM 110 or 223, and CHEM 331 or 336; or consent of instructor. 4 hours or 1 unit. Students may not receive credit for both the BIOCH 352-353 sequence and BIOCH 350.

353. General Biochemistry

Principles, chemistry, and methods of analysis of the composition and processes of living systems. Required for students in biochemistry curriculum. *Prerequisite:* BIOCH 352 or consent of instructor. 4 hours or 1 unit. Students may not receive credit for both the BIOCH 352-353 sequence and BIOCH 350.

355. Biochemistry Laboratory

Introduction to modern methods of experimentation with biochemical compounds, systems, and processes: qualitative and quantitative measurement of constituents and biochemical reactions in biological systems. Methods for the determination of structure of metabolites and biological macromolecules. *Prerequisite:* CHEM 231 or 236, or equivalent; credit or concurrent registration in BIOCH 350, 352, or 353, or equivalent. Quantitative analytical chemistry and credit or concurrent registration in a course that includes nucleic acid biochemistry (i.e., BIOCH 350 or 353) are recommended. 3 hours or ¾ unit. Concurrent registration in BIOCH 356 is required.

356. Lectures on Biochemistry Laboratory Methods

Lectures on theory and practice underlying modern laboratory techniques in biochemistry. This course emphasizes a thorough understanding of biochemical principles, methods and instrumentation, and critical data analysis used in contemporary biochemical research, and is designed to accompany BIOCH 355. *Prerequisite:* CHEM 231 or 236, or equivalent; credit or concurrent registration in BIOCH 350, 352, or 353, or equivalent. Quantitative analytical chemistry and credit or concurrent registration in a course that includes nucleic acid biochemistry (i.e., BIOCH 350 or 353) are recommended. 3 hours or ¾ unit. Concurrent registration in BIOCH 355 is required.

360. Biochemistry Senior Seminar

Writing intensive course dealing with the technical literature, current issues, and current advances in Biochemistry. *Prerequisite:* Completion of the Campus Composition I general edu-

cation requirement; BIOCH 352 and concurrent registration in BIOCH 353 and/or BIOCH 355/356. 3 hours or ½ unit. Graduate students may register, but priority will be given to undergraduate students.

414. Free Radicals in Biology
Same as VP 414. See VP 114.

440. Research Topics in Biophysical Chemistry
Same as BIOPH and CHEM 440. See CHEM 440.

450. Biomolecular Physics
Same as BIOPH and PHYCS 450. See PHYCS 450.

452. Experimental Techniques in Biochemistry
Experiments concerning the detection, isolation, and characterization of macromolecules, including enzymes, antibodies, and nucleic acids; methods of studying the size, shape, and hydrodynamic properties of macromolecules and other compounds. *Prerequisite:* BIOCH 355/356. ¼ to 1 unit. May be repeated to a maximum of 1½ units credit.

455. Analysis of Biochemical Literature
Discussions of current research and literature. *Prerequisite:* BIOCH 352, 353, and 355/356; or equivalent. ½ unit. Required of all graduate students whose major is biochemistry.

490. Individual Study
Designed for students majoring or minoring in biochemistry who wish to undertake individual studies of a non-Ph.D. thesis nature under the direction of a faculty member of the department. *Prerequisite:* Consent of head of department. ¼ to 4 units (summer session, ¼ to 2 units).

494. Advanced Topics in Biochemistry
Series of half-semester intensive courses on the recent research findings in important areas of biochemistry and molecular biology. Covers such areas as: biophysical methods; enzyme mechanisms; membrane biochemistry; regulation of gene expression; nucleic acid biochemistry; metabolic regulation; cellular communication; and medical biochemistry. Lectures, discussions, student papers, and presentations. *Prerequisite:* BIOCH 352 and 353 and (at the option of the instructor) CHEM 346; or consent of instructor. ½ unit. May be repeated. Students may register for this course more than once in the same term to a maximum of 1 unit.

495. Biochemistry Seminar
Student, faculty, and invited speakers present seminars and discussions on current research topics. Required of all Biochemistry Ph.D. students. *Prerequisite:* Graduate standing and BIOCH 353; or consent of instructor. 0 or ¼ unit. May be repeated in subsequent semesters to a maximum of 3 units.

499. Thesis Research
0 to 4 units.

BIOENGINEERING

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Bioengineering (BIOEN)

120. Introduction to Bioengineering
Lecture and discussion of recent trends in bioengineering; topics typically include the biological interaction with ultrasound and microwave radiation, modeling, instrumentation, biomaterials, biomechanics, biological heat and mass transfer, and medical imaging techniques. 1 hour.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

270. Individual Study
Individual projects. *Prerequisite:* Consent of instructor. 0 to 4 hours.

280. Biomedical Imaging
Same as ECE 280. See ECE 280.

306. Veterinary Orthopedic Biomechanics
Same as V B 306. See V B 306.

314. Biomedical Instrumentation
Same as ECE 314. See ECE 314.

315. Biomedical Instrumentation Laboratory
Same as ECE 315. See ECE 315.

370. Special Topics in Bioengineering
Prerequisite: Consent of instructor. 0 to 4 hours, or 0 to 1 unit. May be repeated.

375. Modeling of Bio-Systems
Same as ECE 375. See ECE 375.

376. Methods in Computational Neurobiology
Same as BIOPH 317, NEURO 317, and PHYSL 317. See PHYSL 317.

380. Magnetic Resonance Imaging
Same as ECE 380. See ECE 380.

498. Individual Study
Individual projects. *Prerequisite:* Consent of instructor. ¼ to 2 units.

BIOLOGY

Department Office: 286 Morrill Hall, 505 South Goodwin Avenue, Urbana
Phone: 333-3044

Biology (BIOL)

100. Biological Sciences

Introduction to biology for the nonmajor. In-depth focus on three contemporary problems-maintaining a livable environment, issues of human health, and evolution. 3 hours. Credit is not given for both BIOL 100 and 101.

101. Biological Sciences

Introduction to biology for the nonmajor, including laboratory. In-depth focus on three contemporary problems-maintaining a livable environment, issues of human health, and evolution. Emphasis in laboratory is on science as a process. Lecture and laboratory. 4 hours. Credit is not given for both BIOL 101 and 100.

104. Animal Biology

Introductory zoological concepts with emphasis on the diversity and comparative anatomy of animals and the fundamentals of physiology, genetics, evolution, and behavior. Enrollment priority is given to students in curricula which require this course. Lecture and laboratory. 4 hours.

105. Insects and People

Same as ENTOM 105. See ENTOM 105.

106. Heredity and Society

Provides nonscience students with an understanding of genetics so they can appreciate how recent discoveries and environmental changes may affect their future and the future of society. 3 hours. Credit is not given for both BIOL 106 and BIOL 120 or 210.

107. Evolution

Principles are emphasized which allow an understanding of the origin and nature of human behavior. Topics include the history of evolution as a science, Darwinism and the development of its modern synthesis, the origin and diversification of life, the evolution of behavior, societies, language, thought and reason. *Prerequisite:* Sophomore standing. 3 hours. Credit is not given for both BIOL 107 and EEE 301.

108. Biology of Human Aging

Comprehensive and critical analysis of what happens as humans age; includes information gained from model systems ranging from cells to such diverse organisms as bamboo and chimpanzees; considers the role of evolution in shaping special features of our life cycle. 3 hours.

120. Genetics, Evolution, and Biodiversity

First course in a three-semester introduction to biology for majors in life sciences curricula and others requiring a good foundation in biology, such as pre-professional students. This lecture-laboratory course covers transmission genetics, evolution and plant and animal phylogeny and systematics. *Prerequisite:* Credit or concurrent registration in CHEM 101 and 105, or 107 and 109. 5 hours. Credit is not given for both BIOL 120 and BIOL 106 or 210.

121. Ecology and Organismic Biology

Second course in a three-semester introduction to biology for majors in life sciences curricula and others requiring a good foundation in biology, such as pre-professional students. This lecture-laboratory course covers ecology and animal and plant physiology. *Prerequisite:* BIOL 120 or consent of Director of Biology Programs, and credit or concurrent registration in CHEM 102 and 106, or credit for CHEM 107 and 109. 5 hours. Credit is not given for both BIOL 121 and 251.

122. Molecular and Cellular Biology

Third course in a three-semester introduction to biology for majors in life sciences curricula and others requiring a good foundation in biology, such as pre-professional students. This lecture-laboratory course covers molecular genetics and molecular and cellular biology. *Prerequisite:* BIOL 121 or consent of Director of Biology Programs, and credit or concurrent registration in CHEM 231. 5 hours. Credit is not given for both BIOL 122 and BIOL 250.

199. Undergraduate Open Seminar

0 to 5 hours. May be repeated.

210. Genetics

Principles of heredity and the nature of genetic material. *Prerequisite:* One year of biology or consent of instructor. 4 hours. Credit is not given for both BIOL 210 and BIOL 106 or 120. (Counts for advanced hours in L.A.S.)

231. Biology of Reproduction

Same as ANSCI 231. See ANSCI 231.

250. The Cell

Study of the biology of cells from the molecular to the microscopic level of organization. Lecture and laboratory. *Prerequisite:* Credit or concurrent registration in organic chemistry; consent of the honors biology committee. 5 hours. Credit is not given for both BIOL 250 and CSB 213 or 215, or BIOL 122.

251. The Organism

Study of the way different classes of organisms respond to challenges of their environment; emphasis on the general features of organismic behavior. Lecture and laboratory. *Prerequisite:* BIOL 250; good standing in the honors biology program; and consent of the honors biology committee. 5 hours. Credit is not given for both BIOL 251 and BIOL 121.

252. Population Biology

Study of problems associated with behavior of plant and animal populations based on genetic, evolutionary, and ecological principles. Lecture and laboratory. *Prerequisite:* BIOL 251; statistics; good standing in the honors biology program; consent of the honors biology committee. 4 hours. (Counts for advanced hours in L.A.S.)

303. Introduction to Neurobiology

Same as NEURO 303. Introduction to the physiology of nerve cells, mechanisms of neural integration, and the organization of sensory and motor systems; also introduces neurochemistry, neuroendocrinology, neural development, neural plasticity, and the physiological basis of behavior. *Prerequisite:*

BIOL 122 or 251, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

304. Biological Clocks

Study of the nature, mechanisms, functions, development, and evolution of the biological rhythms associated with geophysical cycles; emphasizes circadian rhythms and their role as biological clocks for the timing of photoperiodism, celestial orientation, human physiology and behavior. *Prerequisite:* BIOL 122 or equivalent. 2 hours or $\frac{1}{2}$ unit.

309. Ecological Genetics

Study of the genetics of natural populations, stressing empirical observations and experiments. Emphasis on recent theories of genotype/environmental interactions and their relationship to evolutionary processes. *Prerequisite:* BIOL 122 or 210. 3 hours or $\frac{3}{4}$ unit.

310. Immunogenetics and Immunophysiology

Same as ANSCI and VP 310. See ANSCI 310.

316. Population Genetics

Same as ANSCI 316. See ANSCI 316.

317. Quantitative Genetics

Same as ANSCI 317. See ANSCI 317.

324. Chemical Ecology

Chemical bases of ecological interactions among organisms; topics include the chemical structures and functions of messenger compounds important in inter- and intraspecific interactions among plants, insects, higher animals, fungi, microbes, and their environments. *Prerequisite:* Courses in organic chemistry and ecology, or consent of instructor. 3 hours or $\frac{3}{4}$ unit. Offered in alternate years.

338. History of Biology

Same as HIST 338. See HIST 338.

339. Tropical Ecology

Ecological principles as they apply to plants, animals, and humans in tropical habitats; topics include climate, soils and ecosystem processes; seasonality and habitat diversity; community structure, species diversity, and plant-animal interactions; regrowth following natural and human disturbances; and human use and abuse of tropical forests. *Prerequisite:* EEE 212 or PLBIO 381; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

346. Animal Behavior

Same as ANSCI, ANTH, and EEE 346. See EEE 346.

355. Principles of Laboratory Animal Science, I

Same as VP 346 and ANSCI 355. See VP 346.

356. Principles of Laboratory Animal Science, II

Same as VP 356 and ANSCI 356. See VP 356.

358. Mathematical Modeling in Life Sciences

Same as ANSCI and STAT 358. See ANSCI 358.

360. Principles of Systematics

Comprehensive survey of the theory and methodology of systematics as they are

applied today to all groups of organisms, with a practical experience in the acquisition and analysis of systematic data. *Prerequisite:* BIOL 121 and a course in evolutionary biology and systematics, ENTOM 302 or EEE 232 or consent of instructor. 4 hours or 1 unit.

368. Biological Modeling

Same as CPSC, ANSCI, and GEOG 368. See GEOG 368.

369. Spatial Ecosystem Modeling

Same as GEOG and NRES 369. See GEOG 369.

371. Quantitative Biology, I

Theory and practical application in biology of probability and statistics; lectures and assigned problems. *Prerequisite:* MATH 120 or equivalent, or consent of instructor. 4 hours or 1 unit.

372. Quantitative Biology, II

Additional topics in biostatistics, emphasizing nonparametric comparative, correlational, and sequential analyses; multidimensional contingency analyses, circular statistics, binomial sequential sampling. Lecture and discussion. *Prerequisite:* BIOL 371 or consent of instructor. 4 hours or 1 unit.

373. Philosophy of Biology

Same as PHIL 373. See PHIL 373.

390. Special Courses

Experimental and temporary courses. *Prerequisite:* Consent of instructor. 1 to 5 hours, or $\frac{1}{4}$ to 1 unit. May be repeated as topic varies.

391. Biostatistics

Same as CHLTH and VP 391. See VP 391.

417. Advanced Quantitative Genetics

Same as ANSCI 417. See ANSCI 417.

418. Concepts and Topics in Immunology

Same as VP 418. See VP 418.

490. Special Topics in Biology

Individual topics in research conducted under the supervision of faculty members in the School of Life Sciences. Designed for students enrolled in the biology program who would like to become more familiar with specialized fields of study prior to committing themselves to a specific area for their doctorate degree. $\frac{1}{2}$ to 2 units.

491. Design and Analysis of Biomedical Experiments

Same as VP 491. See VP 491.

499. Thesis Research

0 to 4 units.

BIOPHYSICS

Program Office: 388 Morrill Hall, 505 South Goodwin Avenue, Urbana
Phone: 333-1630
URL: www.life.uiuc.edu/Biophysics

Biophysics (BIOPH)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

254. The Physical Basis of Life
Same as BIOEN 254. Introductory biology with emphasis on quantitative chemical and physical principles underlying structure and function; with lab for computer, modeling, and simulation. *Prerequisite:* Mathematics through introductory calculus (MATH 120); one year of chemistry; and one year of physics. 4 hours. (Counts as advanced hours in L A S).

290. Reading and Individual Topics
Reading or laboratory work chosen in consultation with a departmental faculty sponsor. *Prerequisite:* Consent of instructor. 1 to 5 hours. May be repeated to a maximum of 10 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

301. Introduction to Biophysics
Review of the field of biophysics designed to introduce the student to types of biological problems currently under investigation. *Prerequisite:* Eight hours of physics. 3 hours or $\frac{3}{4}$ unit.

317. Methods in Computational Neurobiology
Same as BIOEN 376, NEURO and PHYSL 317. See PHYSL 317.

320. Molecular Biophysics
Same as BIOCH 320. Examines structure and function of biological macromolecules and supramolecular assemblies; uses various display techniques to describe the three dimensional nature of biological structure. Specific topics include: diffraction methods, protein structure and the molecular basis of enzyme catalysis, antibody structure and function, virus structure and assembly; membrane proteins, microtubules and other supramolecular assemblies, nucleic acid structure, protein-nucleic acid interactions. *Prerequisite:* BIOCH 352 or CHEM 346, or equivalent; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

332. Photosynthesis
Same as PLBIO 332. Comprehensive description of photosynthesis. Topics include: the photosynthetic membranes, light absorption, electron and proton transfer, photophospho-

rylation, water oxidation, RUBP carboxylase/oxygenase, photorespiration, whole plant photosynthesis, translocation and herbicide action. *Prerequisite:* PLBIO 330, BIOCH 350, BIOPH 301, or equivalent; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

354. Biological Energy Conversion
Introduces and explores the major mechanisms of energy conversion in biology, with particular emphasis on respiratory and photosynthetic bioenergetics, and the physicochemical tools required to describe these processes. *Prerequisite:* BIOCH 350, and CHEM 340 or equivalent; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

401. Macromolecular Modeling
Modeling of macromolecular interactions, structure, dynamics and changes. Extensive use of computers and graphics workstations to carry out modeling and simulations of proteins and nucleic acids. *Prerequisite:* Consent of instructor. 1 unit.

404. Physiological Measurements
Same as PHYSL 404. See PHYSL 404.

410. Special Topics in Biophysics
Advanced course/tutorials on topics of interest in biophysics, such as electrophysiology, radiation biology, bioenergetics, bioacoustics, protein structure, or the physics of muscular contraction. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit.

411. Seminar
Survey of literature in one area of biophysics, with special emphasis on student reports. *Prerequisite:* Enrollment in the biophysics program or consent of instructor. $\frac{1}{4}$ or $\frac{1}{2}$ unit.

414. Sensory Biophysics
Advanced treatment of sensory systems which are approachable in detailed quantitative terms, with emphasis on the visual system; lectures scheduled for four weeks during the first quarter of the spring semester. Normally carries $\frac{1}{4}$ unit credit; however, students may develop a particular topic introduced in the lectures into a term paper for an extra $\frac{1}{4}$ unit credit. *Prerequisite:* BIOPH 301, PHYSL 301, or consent of instructor. $\frac{1}{4}$ or $\frac{1}{2}$ unit. Students must consult the instructor before enrolling for $\frac{1}{2}$ unit.

415. Radiation Biophysics
Consideration in quantitative terms of the mechanisms of the responses of molecules and cells to ionizing radiation; meets for four weeks during the second quarter of the spring semester in alternate years. *Prerequisite:* Graduate standing in biophysics, one year of physics beyond introductory physics, and BIOPH 301 or consent of instructor. $\frac{1}{4}$ unit.

428. Cell Membranes
Isolation and biochemical analysis; experimental membrane models; Gouy-Chapman-Stern layers; equations of transport (diffusional, mediated, and active); phospholipid bilayers and protein subunits; and cell membrane synthesis (in vivo and in vitro). Meets for four weeks during the second half of the spring semester in alternate years. *Prerequisite:* BIOPH 301; BIOCH 350 or equivalent. $\frac{1}{2}$ unit.

438. Bioenergetics of Photosynthesis
Same as PLBIO 438. Biophysical and biochemical mechanisms of green plant and/or bacterial photosynthesis; includes the role of membranes; and emphasizes energetic aspects of photosynthesis. Meets for four weeks during the last half of the fall semester in alternate years. *Prerequisite:* One year each of college-level physics, chemistry, and biology; BIOCH 350 or BIOPH 301; or consent of instructor. $\frac{1}{2}$ unit.

440. Research Topics in Biophysical Chemistry
Same as BIOCH and CHEM 440. See CHEM 440.

442. Biomedical Magnetic Resonance
Principles of magnetic resonance and its application to biology and medicine; includes discussion of magnetic resonance imaging and spectroscopy of living systems. *Prerequisite:* Introductory biology and physical chemistry. $\frac{3}{4}$ unit. Meets in the fall semester of alternate years.

446. Bacterial Energetics
Same as MCBIO 446. Describes and analyzes the principles of biological energy transduction using diverse examples from prokaryotic metabolism; includes fermentations, aerobic and anaerobic respiration, photosynthesis. Meets during the last half of the spring semester. *Prerequisite:* BIOCH 350 or CHEM 340, or equivalent; or consent of instructor. $\frac{1}{2}$ unit.

450. Biomolecular Physics
Same as BIOCH and PHYCS 450. See PHYCS 450.

463. Radioisotopes in Biological Research: Principles and Practice
Same as V B and ANSCI 463. See V B 463.

475. Biophysics of Muscle
Description and analysis of the fundamental physical processes underlying motility and contraction in living systems; surveys recent advances and assesses current status of relevant problems; meets for four weeks during the second quarter of the spring semester in alternate years. *Prerequisite:* CHEM 340 or 342, and BIOCH 350. $\frac{1}{4}$ unit.

490. Individual Topics
For graduate students wishing to study individual problems or topics not assigned in other courses. Topics covered include bioacoustics, electrophysiology, bioenergetics, cellular biophysics, dynamics of macromolecules, fluorescence spectroscopy, kinetics, mathematical biophysics, membrane biophysics, molecular biophysics, muscle biophysics, nervous activity, photosynthesis, protein-lipid interactions, radiation biophysics and oncology, senescence, thermoregulation, vision, macromolecular structure, cerebral energy metabolism. *Prerequisite:* Consent of department. $\frac{1}{2}$ to 2 $\frac{1}{2}$ units.

499. Thesis Research
Research may be conducted in one of the areas listed below, subject to approval of the staff member concerned and the department in which the research is to be done: (a) bioacoustics; (b) bioelectricity; (c) bioenergetics; (d)

cellular biophysics; (e) dynamics of macromolecules; (f) fluorescence spectroscopy; (g) kinetics; (h) computational biophysics; (i) membrane biophysics; (j) molecular biophysics; (k) muscle biophysics; (l) photosynthesis; (m) protein-lipid interactions; (n) radiation biophysics and oncology; (o) senescence; (p) thermoregulation; (q) vision; (r) macromolecular structure; (s) cerebral energy metabolism; (t) magnetic resonance; (u) complex systems; (v) computational neurobiology. 0 to 4 units.

BRIDGE PROGRAM

Director: Ronald L. Woolfolk
Office: 270 Lincoln Hall, 702 South Wright Street, Urbana
Phone: 244-1588

Bridge Program (BR)

100. Summer Bridge—Reading

Intensive course designed to improve critical comprehension skills for effective reading of college texts and primary sources; not intended for credit toward a baccalaureate degree. 0 hours. Offered only as part of the Summer Bridge Program.

101. Summer Bridge—Composition

Intensive course designed to improve writing skills; not intended for credit toward a baccalaureate degree. 0 hours. Offered only as part of the Summer Bridge Program.

102. Summer Bridge—Math

Intensive course designed to improve arithmetical and elementary algebraic skills; topics vary according to the needs of the students, but generally include elementary algebra (absolute value, first degree equations and inequalities, algebraic expressions, rules of exponents, factoring graphing, quadratic equations); not intended for credit toward a baccalaureate degree. 0 hours. Offered only as part of the Summer Bridge Program.

103. Summer Bridge—Computer Skills

Intensive course designed to develop computer skills; not intended for credit toward a baccalaureate degree. 0 hours. Offered only as part of the Summer Bridge Program.

BULGARIAN

(See Slavic Languages and Literature)

BUSINESS

Dean of College: Howard Thomas
College Office: 260 Commerce Building (West), 1206 South Sixth Street, Champaign
Phone: 333-2747
URL: www.cba.uiuc.edu

Business (BUS)

199. Undergraduate Open Seminar 1 to 5 hours. May be repeated.

299. International Business Study in Absentia

Upon prior written approval of the College of Commerce and Business Administration Office of Undergraduate Affairs, a student may earn up to 18 credit hours per semester undertaking a study and/or research project in international business at accredited foreign institutions or approved overseas programs. Final determination of appropriate credit will be made upon completion of the work done abroad. While absent from the Urbana-Champaign campus, the student must continue to pay all fees required by the University of Illinois to retain continuity of enrollment and to allow the time spent away from this campus to count toward residency. *Prerequisite:* One semester in residence at UIUC, good academic standing, completion of at least forty-five semester hours toward the bachelor's degree, and prior approval of course work by the College of Commerce and Business Administration Office of Undergraduate Affairs. 0 to 18 hours. This course may be repeated to a maximum of 18 hours per semester, and 36 hours total.

BUSINESS ADMINISTRATION

Head of Department: Kent B. Monroe
Department Office: 350 Commerce Building (West), 1206 South Sixth Street, Champaign
Phone: 333-4240
URL: www.cba.uiuc.edu/ba/dept

Business Administration (BADM)

199. Undergraduate Open Seminar 1 to 5 hours. May be repeated.

200. The Legal Environment of Business

Examination of the nature of law and the formation and application of legal principles; the role of law in society; the legal environment in which business operates, particularly government taxation; the regulation of commerce, competition, and labor-management relations;

and the concept of property: its creation, transfer, and importance to our business society. *Prerequisite:* Junior standing. 3 hours.

202. Principles of Marketing

Emphasizes the concepts of planning, organization, control, and decision making as they are applied in the management of the marketing function. *Prerequisite:* ECON 172 or equivalent. 3 hours.

205. Business Location Decision-Making: Theory and Practice

Same as GEOG 205. See GEOG 205.

210. Management and Organizational Behavior

General analysis of management and organizational behavior from a systems point of view, including classical organizational theory and management, organizational behavior, and management science; environmental forces; planning, organizing, and control processes; motivation, incentives, leadership, communication, and interpersonal relations; and discussion of production and decision-making and mathematical models. *Prerequisite:* Junior standing. 3 hours. Credit is not given for both B ADM 210 and 247.

212. Principles of Retailing

Gives a general analysis of the structure of retailing emphasizing the retailing environment and operating efficiencies; includes patronage behavior, merchandise control, pricing, promotion, location, and vendor relations; and gives special attention to emerging trends in retailing. *Prerequisite:* B ADM 202. 3 hours.

261. Summary of Business Law

Basic principles of the private law of business including the law of contracts, agency, and business organizations; a brief introduction to the law of sales, commercial paper, security devices, and property. *Prerequisite:* Junior standing. 3 hours. Credit is not given for both B ADM 261 and 303.

274. Operations Research

Introduction to methods of operations research from an executive or managerial viewpoint, emphasizing formulation of business problems in quantitative terms; industrial applications of linear programming, dynamic programming, game theory, probability theory, queuing theory, and inventory theory. *Prerequisite:* ECON 173, or consent of instructor. 3 hours.

294. Senior Research

Research and readings course for students majoring in business administration. May be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Cumulative GPA of 3.0, honors in the junior year, or consent of instructor; senior standing. 2 to 4 hours.

295. Senior Research

Research and readings course for students majoring in business administration. May be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Cumulative GPA of 3.0 or honors in the junior year; senior standing. 2 to 4 hours.

300. Socio-Economic Management as Public Policy

Same as ACCY 322, POLS and SOC S 300. See POLS 300.

303. Principles of Business Law

Contracts, sales, products liability, commercial paper, debtor-creditor relations, property, agency and employment, partnership, corporation. *Prerequisite:* B ADM 200 or consent of instructor. 4 hours or 1 unit.

314. Production

Introduction to production management, consideration of major problems of the production area, and the use of quantitative methods for solving them. *Prerequisite:* B ADM 274 or consent of instructor. 3 hours or ½ unit.

315. Management in Manufacturing

Application of production concepts and quantitative techniques to actual industrial problems; the mathematical structure of the particular production problems; the general structure of the production system and its interaction with marketing and budgeting; and areas including inventory control, production processes, programming, production control, forecasting of production levels, simulation of the production system, and physical planning of industrial plants. *Prerequisite:* B ADM 314. 3 hours or ½ unit.

320. Marketing Research

Focuses on the techniques and methods of marketing research; emphasizes primarily survey research and experimental design; and offers students the opportunity to apply techniques to real-world situations. *Prerequisite:* B ADM 202 and ECON 172. 3 hours or ½ unit.

321. Individual Behavior in Organizations

Understanding the behavior of employees in work organizations; particular attention to the motivation of individuals to join and perform in organizations and to employee satisfaction with elements of the work environment; and emphasis on various management strategies to modify employee motivation and satisfaction. *Prerequisite:* B ADM 210, graduate standing, or consent of instructor. 3 hours or ¾ unit.

323. Organizational Design and Environment

Understanding of complex organizations; particular attention to ways of dividing work, achieving coordination, and issues connected with change and adaptation. *Prerequisite:* B ADM 210. 3 hours, or ½ to 1 unit.

337. Promotion Management

Studies the effects of promotion upon sales and society from managerial and behavioral points of view; examines management of the advertising, sales promotion, and sales force functions within the context of an overall marketing program; includes consumer response to advertising, promotional planning and budgeting, advertising and sales research, media selection, legal environment of promotion, and sales force management and control; takes an analytical focus throughout; uses case studies. *Prerequisite:* B ADM 202. 3 hours or ½ unit.

338. Strategic Management in Food and Agribusiness

Same as ACE 331. See ACE 331.

339. Practicum in Food and Agribusiness Management

Same as ACE 333. See ACE 333.

343. Purchasing and Materials Management

Examines the analysis, planning, and forms of organization that are associated with the buying functions in business. Major focus on the principal issues involved in the procurement of raw materials, components, equipment, operating supplies, and services. Also treats the unique aspects of institutional and government purchasing. Case problems constitute a major vehicle of instruction. *Prerequisite:* B ADM 200 and 202. 3 hours or ¾ unit.

344. Buyer Behavior

Studies the factors affecting customer behavior in household and organizational markets and their relevance for marketing management planning and analysis; provides an overview of explanations of consumption differences anchored in socioeconomic, demographic, cultural, and psychological processes; and surveys buyer decision-making processes and their implications for marketing strategy. *Prerequisite:* B ADM 320. 3 hours or ½ unit.

345. Small Business Consulting

Through guided experience, students identify and offer advice to local small business firms; exposes students, serving as consultants, to the wide variety of problems facing the smaller firm as well as enables them to apply current business methods to real problems. Students work in teams. *Prerequisite:* Junior standing in the College of Commerce and Business Administration or admission to the Master of Business Administration program; or consent of instructor. 4 hours or 1 unit.

346. Entrepreneurship: Small Business Formation

Studies entrepreneurship for those with a serious interest in owning their own business within five years of graduation; students prepare a comprehensive business plan for starting or acquiring such a business; also studies the problems of an existing small business. *Prerequisite:* Consent of instructor. 4 hours or 1 unit.

347. Legal Strategies for the Entrepreneurial Firm

Addresses the legal and managerial strategies important to the emerging firm, with particular focus on defensive legal strategies in the context of entrepreneurship. From the entrepreneur's perspective, examines the law of partnerships, sole proprietorships, corporations, joint ventures, agency, and defensive strategies to thwart takeovers. 4 hours or 1 unit.

351. Personnel Administration

Studies concepts and methods used by the staff personnel unit in building and maintaining an effective work force in an industrial organization; development of ability to design the personnel subsystem within the firm and to deal effectively with problems encountered in such areas as recruitment, selection, train-

ing, and wage and salary administration; and considerable emphasis on case analysis, role playing, and research. *Prerequisite:* B ADM 323; ECON 173 and 240. 3 hours, or ½ to 1 unit. Credit is not given for B ADM 351 and PSYCH 245.

352. Pricing Policies

The role of pricing in contemporary marketing and major pricing decisions facing the firm; theoretical, economic, and practical methods and models for setting prices; pricing new products, initiating price changes, and responding to competitive pricing; the relationship of pricing objectives and strategies to the goals of the firm; and sealed bidding for contracts. *Prerequisite:* B ADM 202. 3 hours or ½ unit.

360. Marketing to Business and Government

Introduces the general area of industrial marketing; examines the nature of industrial markets especially as they compare to consumer markets and emphasizes such factors as the demand for industrial goods, marketing intelligence systems for industrial firms, marketing strategy in industrial markets, and analyses and control of industrial marketing programs; integrates important concepts from sales management and business logistics throughout the course; uses case studies. *Prerequisite:* B ADM 202. 3 hours or ½ unit.

362. Business-to-Business Selling

Addresses the principles, techniques, and analysis of selling to professional buyers as well as the organization and administration of the selling function as it relates to marketing strategy and the achievement of corporate objectives. The application of classroom concepts is practiced under supervision during laboratory sessions. *Prerequisite:* B ADM 343 or 344 or consent of instructor, junior or senior standing. 3 hours or ¾ unit.

369. Logistics Management

Treats the total flow of materials from their acquisition as basic or unprocessed supplies to delivery of the finished product, as well as the related counter-flows of information that both record and control material movement. Major topics include forecasting material requirements; transportation planning; order processing system; raw material, in-process and finished goods inventory management; packaging; in plant and field warehousing; location theory (space, time, and cost trade-offs); communications; and control. *Prerequisite:* B ADM 343 or 360. Senior standing. 3 hours or ¾ unit.

370. International Marketing

Examines social, political, cultural, and economic environmental differences among countries in terms of their impact on the strategy of extension versus adjustment of marketing practice by multinational corporations; examines each marketing function in detail with respect to the specific areas the international marketer must examine. A special section concentrates on international market research. *Prerequisite:* B ADM 344 or consent of instructor. 3 hours or ½ unit.

380. Advanced Marketing Management

Integrative study of methods and models for marketing decision-making; emphasizes the application of analytical tools and behavioral and quantitative models to marketing decision-making. Uses lectures, case studies and simulation exercises. *Prerequisite:* B ADM 274 and 344. 3 hours or ½ unit.

382. Introduction to International Business

Analyzes the major business management functions of international business operations of multinational firms; topics include international business environment, organizational policies and strategies of multinational companies, industrial relations and control policies. *Prerequisite:* B ADM 202 or 210, or equivalent; ECON 101 or 102. 3 hours or ½ unit.

384. International Management

Analyzes the impact of socio-cultural variables on organization structure processes, decision-making, leadership role, employee motivation and productivity in the international business area. *Prerequisite:* B ADM 202 or 210, or equivalent; senior standing. 3 hours or 1 unit.

389. Business Policy

Analysis of policy formulation and implementation from a company-wide standpoint; emphasis on integration of knowledge and approaches across functional areas; both endogenous and exogenous factors which affect company policies; and the role of the firm in society. *Prerequisite:* Senior standing in the College of Commerce and Business Administration. 3 hours or ½ unit.

391. Introduction to Management Information Systems

Same as ACCY 332. See ACCY 332.

392. Information Organization for Management Information Systems

Same as ACCY 333. Data collection, classification, verification, and transmission; file organization, including sequential and random processing techniques, record locating, overflow procedures, and file security; analysis of alternative methods of data organization; commercial file management systems; design of data processing systems; and instruction in COBOL and use of case studies. *Prerequisite:* ACCY 332 or consent of instructor. 3 hours, or ½ to 1 unit.

393. Management Information System Development

Same as ACCY 334. Essential steps in developing a management information system, including preliminary planning, design, feasibility analysis, implementation schedule, and postimplementation review of the system; includes a semester-long project which familiarizes students with methodology and techniques. *Prerequisite:* ACCY 332 or B ADM 392, or consent of instructor. 3 hours, or ½ to 1 unit.

394. Management Information and Control Systems

Same as ACCY 335. See ACCY 335.

395. Decision Support Systems

Examines the recent developments in information technology—such as artificial intelligence,

database management, expert systems, group decision support, machine learning methods, and computer-supported coordination technology—for managerial decision support. Real-world cases of applying these information technologies to management information systems will be discussed. *Prerequisite:* B ADM 392. 3 hours, or ¾ or 1 unit.

404. Applied Multivariate Analysis in Business

Advanced doctoral level seminar on the applications of multivariate statistical techniques to marketing and business problems; critically examines the relevance of optimization rules and inferential properties of various multivariate techniques including regression, AID, MANOVA, discriminant, canonical, factor, clustering and multidimensional scaling for marketing and business problems; particularly emphasizes pitfalls of data and computational problems. *Prerequisite:* PSYCH 494. 1 unit.

407. Behavioral Research Methods in Business Administration

Theory and practice of research methodology for the study of administrative, industrial, and consumer behavior and organizations; alternative methods of data collection and their strengths and weaknesses; observational, questionnaire, field, and laboratory experimentation and statistical analysis of pregathered time-series and cross-sectional data; and examples of good and bad research in business disciplines. A completed individual research project of potentially publishable nature is formally presented in class. *Prerequisite:* Basic inferential statistics course; credit or concurrent registration in B ADM 408. 1 unit.

408. Foundations of Behavioral Science for Management

Develops and integrates fundamental behavioral concepts and theory having administrative applications; initially focuses on the individual decision maker and ultimately includes interpersonal, organizational, and social structures and influences; and develops strategies and methods of research on behavioral applications in business. 1 unit.

409. Organizational Behavior

Same as L I R 409. Examines and analyzes the organization as a social system and the impact of its various components on work attitudes and behavior; topics include the development of organizational structures, organizational effectiveness, decision making and policy formulation, leadership, and change. *Prerequisite:* B ADM 408. 1 unit.

410. Individual Behavior in Organizations

Same as POL S460, PSYCH 453, and SOC 456. Introduction to the principal theories and important empirical research in various disciplines that study organizations; in addition to examination of the subject matter content of various disciplines, students critically examine the capacities and limitations of the various fields to make contributions to the study of organizations. *Prerequisite:* Enrollment as a major in organizational sciences in a cooperating program or consent of instructor. 1 unit.

410. Individual Behavior in Organizations
Same as POL S 460, PSYCH 453 and SOC 456. Introduction to the principal theories and important empirical research in various disciplines that study organizations; in addition to examination of the subject matter content of various disciplines, students critically examine the capacities and limitations of the various fields to make contributions to the study of organizations. *Prerequisite:* Enrollment as a major in organizational sciences in a cooperating program or consent of instructor. 1 unit.

411. Problems of Personnel Management

Same as L I R 448. Examines the organization and administration of the personnel function in management; the relations of personnel administration to operating departments and the scope of business and industrial personnel services; analytical appraisal of policies and practices in selected areas of personnel administration, such as selection and training, carried out through case studies and direct industrial contracts; and specific consideration given to problems up to and including placing the person on a job. *Prerequisite:* Consent of instructor. 1 unit.

412. Organization and Its Environment

Analysis of business organizations adapting to shifts in internal and external elements; major emphasis on (1) the business firm as a part of a complex socioeconomic system; (2) the effects of government, labor unions, and political, religious, and business organizations on the executive's decision problems; (3) environmental factors conducive to organizational change; and (4) organizational growth. *Prerequisite:* B ADM 409. 1 unit.

414. Human Resources Management and Strategy

Same as L I R 465. See L I R 465.

420. Marketing Management

Introduces concepts useful in understanding marketing systems and buyer behavior in addition to developing skills in making marketing decisions; the orientation is primarily managerial and uses examples from both business and nonbusiness contexts. 1 unit.

421. Marketing Strategy

Formal analysis of strategy drawing on concepts from the theory of games, decision theory, value theory, and information theory; topics cover elements of game models, classes of decision problems, games against nature, modern utility theory, information theory, group decision making, statistical decision theory, and linear and nonlinear optimization. 1 unit.

422. Marketing Models

The role of models in the design, implementation, and adjustment of seller strategy; application of simulation, programming, and other methods to the specification and solution of product, price, promotion, and other marketing problems; and topics including the nature of models and model building, forecasting models, optimization models, and other decision models. *Prerequisite:* B ADM 421. 1 unit.

423. Consumer Behavior

Studies alternative models of buyer behavior; focuses attention on psychological, sociological, and economic factors including motivation, learning, attitudes, personality, reference groups, social stratification, demographics, life-styles, and cross-cultural differences and their impact on purchasing, consumption, and choice decisions. *Prerequisite:* B ADM 420. 1 unit.

425. New Product Development

The decisions on the firm's total market offer, including such topics as use of market analysis in making decisions on assortment, product development, pricing, packaging, branding, and sales forecasting; coordination of these decisions and actions with market communications, physical movement, production, finance, and the overall goals and policies of the firm; and emphasizes the use of analytic and research methods in making assortment and product decisions. *Prerequisite:* B ADM 420 and 472; or consent of instructor. 1 unit.

426. Marketing Theory and Systems

Detailed study of macro- and micro-marketing systems and the various approaches to marketing theory; attention given to general systems theory, the nature of marketing systems, system adaptation to the environment, concepts of theory, and major approaches to macro- and micro-theory in marketing. 1 unit.

427. Sales Force Management

Examines primary elements and problems in the area of sales force management; studies such topics as the dyadic interaction between the buyer and seller, the sales presentation, important salesperson characteristics, the selection, training, assignment, motivation, and compensation of salespeople, supervision and evaluation of the sales force, and coordination of the sales force with other elements in a firm's marketing program. Uses case studies. *Prerequisite:* B ADM 420. 1 unit.

428. Promotional Strategy

Management orientation to promotional strategy for the medium and large size organization: includes analyses of the primary elements of the promotional function from both qualitative and quantitative perspectives emphasizing such factors as (1) selection among alternative promotional tools, (2) the promotional budgeting and allocation process, and (3) determination of appropriate messages and media schedules for given product/market situations. Explores widely used models in depth for strategic usefulness; emphasizes case analysis and contemporary situations. *Prerequisite:* B ADM 420. 1 unit.

429. Marketing Research

Examines the collection and analysis of information applied to marketing decisions; stresses quantitative methods including samplings, scalings, experimental design, forecasting, and multivariate procedures through the use of class projects on actual market research problems. *Prerequisite:* B ADM 472, and credit or concurrent registration in B ADM 420. 1 unit.

431. Survey Methods in Marketing Research

Same as SOC 474. Analysis of survey methods in marketing with emphasis on sample design, data collection, and data processing; an advanced course in the methods required to design, implement, and evaluate a research project. *Prerequisite:* ECON 171 or equivalent. 1 unit.

435. The Sampling of Human Populations and Social Organizations

Same as SOC 485 and PSYCH 485. Procedures for selecting samples from and estimating population parameters for human populations and social organizations; types of sample designs treated include simple random samples, stratified, and cluster samples together with random number and systematic selection techniques; and emphasis given to the study of various kinds of advanced sample designs for both area and institutional settings together with the problems involved in the application of analytical statistics to complicated sampling procedures. Each student is required to participate in a field project which involves the actual selection of a cluster sample from the local area. *Prerequisite:* SOC 387 or consent of instructor. 1 unit.

438. Research Seminar in Consumer Behavior

Advanced doctoral level seminar which critically examines the relevance of behavioral and social constructs for generating consumer behavior theories with the use of philosophy of science and metatheory criteria; specifically discusses the need for, and procedures with which to modify behavioral/social constructs and processes such as motivation, concept formation, information processing, choice axioms, attitude consistency, and group norms. *Prerequisite:* B ADM 415. 1 unit.

444. Strategic Management for Competitive Advantage

Policy construction and planning of policy implementation at the executive level; case studies of company-wide situations from the management point of view; and integration and application of material from previous courses. Credit is not given for both B ADM 444 and 389. *Prerequisite:* B ADM 409, 420, and 467, FIN 451, or equivalent. 1 unit.

452. Legal Aspects of Management Decisions

The legal environment in which business decisions are made, including the legal system and the role of courts, government taxation and regulation of business, administrative law, antitrust law, labor law, and trends in the law affecting business policy. 1 unit.

467. Process Management

Introductory course in decision-making problems in production; includes the theoretical foundations for production management as well as the applications of decision-making techniques to production problems in the firm; and considers production processes, plant layout, maintenance, scheduling, quality control, and production control in particular. *Prerequisite:* B ADM 472 and 473. 1 unit.

468. Production Planning and Control

In-depth treatment of decision-making topics in production at the factory manager level and above; topics include the development of generalized decision rules and systems analysis in production; and particular emphasis on the design of production control, quality control, and inventory control systems, and how each of these systems is integrated into the firm as a whole. *Prerequisite:* First year of the Master of Business Administration program. 1 unit.

472. Statistics for Management Decision Making

The application of classical and modern statistics for business decision making. The level of the course assumes some prior knowledge of basic statistics as well as facility with elementary calculus. 1 unit.

473. The Quantitative Analysis of Decisions

Introduction to operations research techniques; topics include the construction and solution of linear models under certainty, and the construction of probabilistic models, specifically queuing theory, Markov chains, and sequential decisions. 1 unit.

475. Systems Modeling and Simulation

Same as C S 445. Elements of computer simulations, including modeling deterministic and stochastic systems, generation of random numbers and variables, and probability and statistics related to modeling, validating, running, and of interpreting computer simulations. *Prerequisite:* C S 105 or 125 and STAT 310, or equivalent background in computer and statistical principles, or consent of the instructor. 1 unit.

476. Business Forecasting and Econometrics

Introduction to maximum likelihood estimating techniques; topics including the use and limitations of least squares, two-stage least squares, limited-information and full-information estimates; and consideration of problems with observational errors, multicollinearity, and autocorrelation in time-series and cross-section structural estimation. A major portion of the course is devoted to the application of the econometric techniques in business forecasting and analysis. *Prerequisite:* B ADM 472. 1 unit.

477. Economics of Decision Making

The operational analysis of the problems of individual decisions under uncertainty that arise in the practice of management. *Prerequisite:* B ADM 472. 1 unit.

478. Stochastic Models in Management Science

Application of Markov processes to describe, analyze, and design systems of interest in management science, including queues, inventory, production, brand loyalty, stock market, and other applications. *Prerequisite:* MATH 361 or STAT 310, or equivalent. 1 unit.

479. Mathematical Programming for Management Science

Mathematical programming models (linear, integer, quadratic, nonlinear, dynamic, and combinatorial) used to describe, analyze, and

design systems such as production, transportation, scheduling, and planning. *Prerequisite:* MATH 315 or equivalent. 1 unit.

482. International Business Operations, I
Integration of economics and the functional areas of business focused on the problems of managing international business operations; studies economic, legal, functional, and administrative problems through cases and literature emphasizing financial and marketing problems. Students select one area from the following for special study and reporting: Europe, Latin America, Africa, Middle and Near East, or South Asia and Far East. *Prerequisite:* Completion of first year of the Master of Business Administration program. 1 unit.

483. International Business Operations, II
Continuation of B ADM 482. *Prerequisite:* B ADM 482. 1 unit.

486. Japanese Business and Management Systems

Analyzes the business and management systems of Japan and compares them with the American business and management systems; topics include quality circles and quality of work life; the human side of Japanese productivity; business-government relations in Japan; organizational strategies and policies of Japanese business organizations; economic, political, legal, and ecological factors affecting Japanese management systems. *Prerequisite:* Graduate standing; B ADM 409 or equivalent. 1 unit.

490. Seminar in Business Administration
Special topics in the general area of business. Topics are selected by the instructor at the beginning of each semester. 0 to 1 unit.

491. Proseminar in Business Administration

Lectures in topics of current interest not covered by regular course offerings. Subjects are announced in the *Timetable*. *Prerequisite:* Consent of instructor or head of department. 0 to 1 unit. Approved for S/U grading.

493. Research in Special Fields
¼ to 2 units.

494. Independent Study and Research
Directed reading and research. ½ or 1 unit.

499. Dissertation Research
Required of all students writing doctoral dissertations in business administration; guidance in writing theses and seminar discussions of interim progress reports. 0 to 4 units.

BUSINESS AND TECHNICAL WRITING

(See English)

CAMPUS HONORS PROGRAM

Director: Bruce F. Michelson
Office: 1205 West Oregon Street, Urbana
Phone: 244-0922
URL: www.honors.uiuc.edu

Campus Honors Program (CHP)

295. Interdisciplinary Honors Seminar
Seminar on interdisciplinary topics in the natural sciences, social sciences, humanities, and arts. Open to Chancellor's Scholars and other honors students. *Prerequisite:* Junior standing in the Campus Honors Program. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

CATALAN

(See Spanish, Italian, and Portuguese)

CELL AND STRUCTURAL BIOLOGY

Head of Department: Martha Gillette
Department Office: B107 Chemical and Life Sciences Laboratory, 601 South Goodwin Avenue, Urbana
Phone: 333-6118
URL: www.life.uiuc.edu/csb

Cell and Structural Biology (CSB)

213. Cells and Tissues
Lecture introduction to the fundamental organization and structure of animal cells and tissues and plant cells, including ultrastructure. *Prerequisite:* BIOL 121. 3 hours. Credit is not given for both CSB 213 and BIOL 250. Credit is also not given for CSB 213 and 300, unless 300 is taken after 213. (Counts for advanced hours in L.A.S.)

215. Cells and Tissues Laboratory
Laboratory course in the functional organization and structure of cells and tissues. *Prerequisite:* Credit or concurrent registration in CSB 213 or 300; or equivalent lecture course with consent of instructor. 2 hours. Credit is not

given for both CSB 215 and BIOL 250. (Counts for advanced hours in L.A.S.)

216. Molecular Genetics of Animal Cells

Introduction of the structure, expression, and regulation of genes of higher eukaryotes with an emphasis upon animal cells. Specific topics will include chromatin structure and its relation to gene expression, regulation of gene expression during development, recombination, molecular genetic technologies, gene replacement therapy, and the molecular genetics of cancers. *Prerequisite:* BIOL 122 or consent of instructor. 3 hours. Students may not receive credit for both CSB 216 and CSB 300 and/or 301. (Counts for advanced hours in L.A.S.)

217. Animal Molecular Genetics Laboratory

Laboratory course in molecular genetics with a strong emphasis upon animal cells. *Prerequisite:* Credit or concurrent registration in CSB 216. 2 hours. (Counts for advanced hours in L.A.S.)

234. Functional Human Anatomy

Studies the essentials of functional human anatomy with special reference to skeletal, muscular, splanchnic, circulatory, and nervous systems. Lecture and laboratory. *Prerequisite:* BIOL 122 or PHYSL 103; or consent of instructor. 5 hours. (Counts for advanced hours in L.A.S.)

290. Individual Topics

Laboratory work and/or reading in fields selected in consultation with an appropriate faculty member. *Prerequisite:* Fifteen hours in Life Sciences courses including one course in CSB, and consent of instructor. 1 to 5 hours. May be repeated to a maximum of 10 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

297. Undergraduate Seminar in Cell and Structural Biology

Review and discussion of current literature describing research in molecular, cellular, and structural biology of higher eukaryotes with an emphasis upon animal systems. *Prerequisite:* Junior or senior standing, majors in CSB, or consent of instructor. 1 hour. May be repeated in subsequent terms to a maximum of 4 hours. These hours will not be counted as advanced hours in the option.

300. Cell Biology, I

Principles of eukaryotic cell biology; consideration of molecular and fine structural components of the cell with an emphasis on experimental analysis of the relationship of structure to function of gene, membrane, cytoskeleton, and extracellular matrix. *Prerequisite:* BIOL 122, and credit or concurrent registration in BIOCH 350 or 352, or consent of instructor. 4 or 5 hours, or 1 or 1¼ unit. Students who have received credit for CSB 300 may not also receive credit for 213.

301. Cell Biology, II

Continuation of Cell Biology, I. Emphasis is on the cell cycle, transport, contractility, motility, and molecular and cellular topics in development, neurobiology, and immunology. *Prerequisite:* CSB 300 or 213, and BIOCH 350 or 352, or consent of instructor. 4 or 5 hours, or 1 or 1½ unit.

307. Structure and Function of the Nervous System

Same as NEURO and PHYSL 315. See PHYSL 315.

308. Immunology

Introduction to fundamentals of immunology with emphasis on biological application; basic background for understanding immunological responses and techniques applicable to biological research. *Prerequisite:* Four semesters of college biology; a course in organic chemistry; or consent of instructor. 4 hours or ¾ unit.

312. Cellular and Molecular Neurobiology

Same as NEURO 312. Cellular and molecular basis of form and function of the nervous system with emphasis on chemical signaling. Topics will include: combinatorial regulation of neurotransmission, nerve terminal, molecular organization of postsynaptic sites, retrograde signals, neurotrophins, cytoskeleton, growth cone motility, gene regulation, axon target selection, chemoaffinity hypothesis, calcium signaling in plasticity, and neurological disorders and therapies. *Prerequisite:* One of the following: CSB 300 or BIOCH 352 or BIOL 303 or PHYSL 316 or consent of instructor. 3 hours or ¾ unit.

315. Human Genetics

Studies the techniques employed for genetic analysis of human traits; discussion of genetic mechanisms operative in human development, metabolism, and behavior; and genetics and human disease. *Prerequisite:* BIOL 122 or 210; biochemistry and statistics recommended. 3 hours or ¾ unit.

322. Anatomy of the Human Extremities

Comprehensive study of the human extremities with emphasis on the principles of systematic anatomy, relations between form and function, and regional dissection. Lecture and laboratory. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

323. Anatomy of the Human Thorax and Back

Comprehensive study of the human thorax and back with emphasis on the principles of systematic anatomy, relations between form and function, and regional dissection. Lecture and laboratory. *Prerequisite:* Consent of instructor. 1 hour or ¼ unit.

324. Anatomy of the Human Abdomen and Pelvis

Comprehensive study of the human abdomen and pelvis with emphasis on the principles of systematic anatomy, relations between form and function, and regional dissection. Lecture and laboratory. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

325. Anatomy of the Human Neck and Head

Comprehensive study of the human neck and head with emphasis on the principles of systematic anatomy, relations between form and function, and regional dissection. Lecture and laboratory. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

380. Developmental Neurobiology

Principles of vertebrate and invertebrate developmental neurobiology with emphasis on the molecular and cellular mechanisms controlling neuronal determination, axon pathfinding, synapse formation, and plasticity. *Prerequisite:* CSB 213 or 300 or consent of instructor. 3 hours or ¾ unit.

410. Special Topics in Cell and Structural Biology

Discussion of current topics of interest in higher eukaryotic cellular and molecular biology, development, neurobiology; seminar or lecture format. Topics do not repeat. *Prerequisite:* Consent of instructor. ¼ to 1 unit. May be repeated to a maximum of 2 units.

412. Cell and Structural Biology Seminar

Invited speakers, faculty, and student presentations and discussions on current research topics. *Prerequisite:* Graduate standing and CSB 300; or consent of instructor. ¼ unit. May be repeated to a maximum of 2 units.

487. Human Neuroscience

Same as NEURO 487. Principles of human neuroscience and mechanisms of neural pathophysiology. *Prerequisite:* One of the following: BIOL 303, PHYSL 315 or 316, or an equivalent course; or consent of instructor. ¾ unit.

490. Individual Topics

Individual topics in research and/or reading for graduate students, to be conducted under the supervision of faculty members in cell and structural biology; designed to allow students to become more familiar with specialized fields of study prior to committing themselves to a specific area for their graduate degree. *Prerequisite:* Graduate standing and consent of instructor. ¼ to 4 units.

491. Experimental Methods in Cell and Structural Biology

Research methods in cellular, muscular, and structural biology; first-year students in the Cell and Structural Biology graduate program participate in research and related activities in a faculty laboratory. Seven week rotation. *Prerequisite:* First-year students in the CSB graduate program and consent of department. ¼ unit.

499. Thesis Research

Research on the thesis and preparation of the thesis. 0 to 4 units (summer: 0 to 2 units). May be repeated in the same or subsequent semesters to a maximum of 4 units (summer session may be repeated to a maximum of 2 units).

CERAMIC ENGINEERING

(See Materials Science and Engineering)

CHEMICAL ENGINEERING

Head of Department: C. F. Zukoski
Department Office: 114 Roger Adams Laboratory, 600 South Mathews Avenue, Urbana
Phone: 333-3640
URL: www.scs.uiuc.edu/chem_eng

Chemical Engineering (CH E)

101. The Hidden World of Engineering

Tells the stories of everyday objects: bathtubs, pop cans and screws. These simple objects shape our lives, yet are engineering masterpieces. To unveil this hidden world the course uses a humanistic approach. Designed to appeal to all majors, it uses human stories-filled with failures and triumphs-to reveal the methods of engineers. The course enchants with tales of ancient steel making, today's pop cans, huge stone monuments, and salt. The course will change how a student looks at his or her world. Several sessions focus on women engineers and the environment. 3 hours.

161. The Chemical Engineering Profession

Lectures and problems on the history and scope of chemical engineering endeavors; decisions and criteria for process development and plant design. *Prerequisite:* CHEM 101 or 107. 1 hour.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Cooperative Education: Planning

Same as CHEM 201. See CHEM 201.

202. Cooperative Education: Industrial Practice

Same as CHEM 202. See CHEM 202.

210. Chemical Engineering Internship

Full-time practice of chemical science in an off-campus industrial setting or research laboratory environment. Summary report required. *Prerequisite:* Completion of freshman year or equivalent, or consent of Director of Cooperative Education in Chemical Engineering. 0 hours. May be repeated in separate semesters. Approved for S/U grading.

261. Introduction to Chemical Engineering
Lectures and problems on material and energy balances. *Prerequisite:* CHEM 102 or 108; credit or concurrent registration in C S 101. 3 hours.

292. Senior Thesis

Limited in general to seniors in the curriculum in chemical engineering. Any others must have the consent of the head of the department. Each student taking the course must register in a minimum of 5 hours either in one semester or divided over two semesters. A maximum registration of 10 hours in two semesters is permitted. However, CH E 390 (2 hours) may be substituted for 2 of the 5 hours required in CH E 292. 1 to 6 hours. In order to receive credit, a thesis must be presented by each student registered in CH E 292. (Counts for advanced hours in L.A.S.)

370. Chemical Engineering Thermodynamics

Fundamental concepts and the laws of thermodynamics; the first and second law applications to phase equilibrium and chemical equilibrium and other applications in the Chemical Engineering profession. *Prerequisite:* CH E 261. 4 hours or 1 unit.

371. Fluid Mechanics and Heat Transfer

Introduction to fluid statics and dynamics; dimensional analysis; design of flow systems; introduction to heat transfer; conduction, convection, and radiation. *Prerequisite:* CH E 261 or consent of instructor. 4 hours or 1 unit.

373. Mass Transfer Operations

Introduction to mass transfer processes and design methods for separation equipment. *Prerequisite:* CH E 371 or consent of instructor. 4 hours or 1 unit.

374. Chemical Engineering Laboratory

Experiments and computation in fluid mechanics, heat transfer, mass transfer, and chemical reaction engineering. Exercises in effective Chemical Engineering communications. *Prerequisite:* CH E 373; credit or concurrent registration in CH E 381; senior standing in Chemical Engineering. 4 hours or 1 unit.

377. Synthesis and Design of Chemical Systems

Capstone design course where students apply principles from previous courses to the design of complete chemical process systems. Topics include: techniques used in the synthesis and analysis of chemical processes, process simulation and optimization, effective communication in a chemical process engineering environment. *Prerequisite:* CH E 373; credit or concurrent registration in CH E 381. 4 hours or 1 unit.

380. Heat, Mass, and Momentum Transport

Unifying treatment of physical rate processes with particular emphasis on the formulation and solution of typical boundary value problems associated with heat, mass, and momentum transport. *Prerequisite:* CH E 371; MATH 285. 3 hours or $\frac{3}{4}$ unit.

381. Chemical Rate and Reactor Design

Chemical kinetics, chemical reactor design, and the interrelationship between transport, thermodynamics, and chemical reaction in

open and closed systems. *Prerequisite:* Credit or registration in CH E 373. 3 hours or $\frac{3}{4}$ unit.

387. Applied Chemical Kinetics and Catalysis

Problems in chemical kinetics; techniques for the prediction and measurement of rates of reactions; and homogeneous and heterogeneous catalysis chain reactions. *Prerequisite:* CHEM 342 or CH E 370. 2 or 3 hours, or $\frac{1}{2}$ or $\frac{3}{4}$ unit.

388. Electrochemical Engineering

Fundamentals of analysis, design, and optimization of electrochemical systems. *Prerequisite:* Senior standing in physical science or engineering. 2 or 3 hours, or $\frac{1}{2}$ or $\frac{3}{4}$ unit.

389. Chemical Process Control and Dynamics

Techniques used in the analysis of process dynamics and in the design of process control systems; includes Laplace transforms, stability analysis, and frequency response methods. Laboratory emphasizes on-line data acquisition and control. *Prerequisite:* CH E 371 and senior standing in Chemical Engineering; MATH 285; C S 101. 4 hours or 1 unit.

390. Individual Chemical Engineering Projects

Laboratory; development of an individual project. *Prerequisite:* Senior standing in Chemical Engineering. 2 hours or $\frac{1}{2}$ unit.

391. Open-Ended Experimental Design

Experimental design projects. Topics include statistical design of experiments, parameter estimation, scale-up, design optimization, process simulation, and statistical quality control. *Prerequisite:* Senior standing in Chemical Engineering. 3 hours or $\frac{3}{4}$ units.

392. Polymer Science and Engineering

Fundamentals of polymer science and engineering: polymerization mechanisms, kinetics, and processes; physical chemistry and characterization of polymers; polymer rheology, mechanical properties, and processing. *Prerequisite:* CH E 370; credit or concurrent registration in CH E 371; CHEM 344. 3 hours or $\frac{3}{4}$ unit. Credit is not given for both CH E 392 and MATSE 350, or MATSE 351.

393. Chemistry and Transport in Microelectronics Processing

Introductory survey of chemical processing principles applied to microelectronic fabrication. Key concepts originate from chemical kinetics; thermodynamics; mass and energy balances; transport of mass, momentum and heat; and process synthesis and integration. *Prerequisite:* Junior or senior standing in Chemical Engineering, Electrical and Computer Engineering, or Materials Science and Computer Engineering. 3 hours or $\frac{3}{4}$ units.

396. Special Topics in Chemical Engineering

Study of topics in chemical engineering; content varies from semester to semester. Typical topics include optimization, chemical kinetics, phase equilibrium, biochemical engineering, kinetic theory, and transport properties. *Prerequisite:* Senior standing in Chemical En-

gineering, or consent of instructor. 1 to 3 hours, or $\frac{1}{4}$ to $\frac{3}{4}$ unit. May be repeated.

465. Chemical Engineering Seminar

Required of all graduate students whose major is Chemical Engineering. *Prerequisite:* CH E 373. $\frac{1}{4}$ unit.

466. Applied Mathematics in Chemical Engineering

Development of mathematical models and a survey of modern mathematical methods currently used in the solution of chemical engineering problems; topics include the application of vectors and matrices, partial differential equations, numerical analysis, and methods of optimization in Chemical Engineering. *Prerequisite:* Consent of instructor. $\frac{3}{4}$ or 1 unit.

467. Chemical Kinetics and Catalysis

Same as CHEM 467. Rates and mechanisms of chemical reactions, treatment of data, steady state and unsteady behavior predictions of mechanisms, prediction of rate constants and activation barriers. Introduction to catalysis. Catalysis by solvents, metals, organometallics, acids, enzymes, semiconductors. *Prerequisite:* An undergraduate course in chemical kinetics. 1 unit.

469. Special Topics in Chemical Engineering

Same as CSE 481. Various advanced topics; generally taken during the second year of graduate study. Typical topics include turbulence, hydrodynamic instability, process dynamics, interfacial phenomena, reactor design, cellular bioengineering, properties of matter at high pressure, and phase transitions. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated.

485. Non-Newtonian Fluid Mechanics and Molecular Rheology

In-depth treatment of continuum and molecular dynamics of non-Newtonian fluids, particularly polymeric systems. Topics include linear and nonlinear viscoelasticity, rheometry and rheo-optics, and molecular rheology. Applications to the processing of rheologically complex materials. *Prerequisite:* CH E 466. 1 unit.

486. Surface Chemistry

Same as CHEM 486. Introduction to the behavior of molecules adsorbed on solid surfaces; the structure of surfaces and adsorbate layers. The bonding of molecules to surfaces; adsorbate phase transitions; trapping and sticking of molecules on surfaces. An introduction to surface reactions; kinetics of surface reactions. A review of principles of chemical reactivity; reactivity trends on surfaces; prediction of rates and mechanisms of reactions on metals, semiconductors, and insulators. *Prerequisite:* CHEM 344. 1 unit.

487. Fluid Dynamics

Basic concepts in fluid dynamics with special emphasis on topics of interest to chemical engineers; derivation of the Navier-Stokes equations; solutions for creeping flow, for perfect fluids, and for boundary layers; non-Newtonian fluids; and turbulence. *Prerequisite:* Consent of instructor. 1 unit.

488. Advanced Topics in Heat and Mass Transfer

Principles of transfer operations developed in terms of physical rate processes; boundary layer heat and mass transfer, eddy diffusion, phase changes, and separation processes. *Prerequisite:* Consent of instructor. $\frac{3}{4}$ or 1 unit.

496. Individual Study

Study under the supervision of a staff member in areas not covered in course offerings. *Prerequisite:* Consent of the staff member under whom the study is to be made. 0 to 1 unit.

497. Special Problems

Individual work on problem-oriented projects not included in theses. This could be research, engineering design, or professional work in chemical engineering which has educational values. The work must be done under the supervision of a staff member with the approval of the department head. $\frac{1}{2}$ to 4 units.

498. Research Seminar

Discussion of recent developments of importance to different areas of chemical engineering research. The course is divided into a number of sections, and subject matter differs from section to section and from time to time. *Prerequisite:* Consent of instructor. 0 to 1 unit. May be repeated.

499. Thesis Research

Candidates for the master's degree who elect research are required to write a thesis. A thesis is always required for the Doctor of Philosophy. Not all candidates for thesis work necessarily are accepted. Any student whose major is in another department must receive permission from the head of the Department of Chemical Engineering to register in this course. 0 to 4 units.

CHEMISTRY

Head of Department: Steven C. Zimmerman
Department Office: 106 Noyes Laboratory, 505 South Mathews Avenue, Urbana
Phone: 333-0711
URL: www.scs.uiuc.edu/chem

Chemistry (CHEM)**100. Introductory Chemistry**

Introduction to the basic concepts and language of chemistry; lectures, recitations, and laboratory. *Prerequisite:* 2½ units in high school mathematics, or credit or concurrent registration in MATH 112. 3 hours. Only students without high school chemistry or with chemistry placement scores inadequate for enrollment in CHEM 101 receive graduation credit.

101. General Chemistry

For students who have some prior knowledge of chemistry. Principles governing atomic structure, bonding, states of matter, stoichiometry, and chemical equilibrium; descriptive

chemistry of the elements and coordination compounds. *Prerequisite:* Credit in or exemption from MATH 112; one year of high school chemistry or equivalent. Placement into 101 by the Chemistry Placement Test recommended. 3 hours. Students may not receive credit for both CHEM 101 and 107.

102. General Chemistry (Biological or Physical Version)

Lecture and recitations. Section B (Biological Version): Chemistry of organic and biochemical systems, chemical energetics and equilibrium, chemical kinetics, and reaction mechanisms. Section P (Physical Version): Chemistry of materials, including organic and biological substances, chemical energetics and equilibrium, chemical kinetics, and solids and crystals. *Prerequisite:* CHEM 101 or 107 or advanced placement credit for one semester of college-level chemistry. 3 hours. Students may not receive credit for both CHEM 102 and 108.

105. General Chemistry Laboratory

Laboratory studies to accompany CHEM 101. *Prerequisite:* Credit or concurrent registration in CHEM 101 is required. 1 hour.

106. General Chemistry Laboratory (Biological or Physical Version)

Laboratory studies to accompany CHEM 102. *Prerequisite:* CHEM 101 and 105; credit or concurrent registration in CHEM 102 is required. 1 hour.

107. Accelerated Chemistry, I

Lectures and recitations. Beginning chemistry course for students in the chemical sciences and others with strong high school chemistry and mathematics preparation. Chemical calculations, structure, bonding and equilibrium. Credit toward graduation is received for CHEM 107 only if CHEM 109 is also completed. *Prerequisite:* Admission by U of I placement test or consent of adviser; credit or concurrent registration in MATH 120 or 135; concurrent registration in CHEM 109. 3 hours.

108. Accelerated Chemistry, II

Continuation of CHEM 107. Lectures and recitations. Emphasizes chemical thermodynamics, equilibrium, chemical kinetics, and coordination chemistry. *Prerequisite:* CHEM 107 and/or 109 and concurrent registration in CHEM 110, or consent of instructor. 3 hours.

109. Accelerated Chemistry Laboratory, I

Laboratory and lecture. Students with appropriate advanced placement or proficiency credit may, with the consent of the department, take this course without concurrent registration in CHEM 107. *Prerequisite:* Concurrent registration or credit in CHEM 107. 1 hour. Students with credit in CHEM 109 can receive credit for CHEM 223, but not for CHEM 122 or 224.

110. Accelerated Chemistry Laboratory, II

Laboratory and discussion. Includes experiments in qualitative analysis, inorganic synthesis, and kinetics as well as an individual project. *Prerequisite:* Concurrent registration in CHEM 108 or consent of department. 2 hours.

115. The Chemistry of Everyday Phenomena

Introduces students majoring in nontechnical fields to the chemical model of the material universe describing the structure and dynamics of changing matter with special emphasis on the materials and processes of everyday living. *Prerequisite:* Two years of high school algebra. 3 hours. Credit not given for students with prior credit in CHEM 101, 107 or equivalent, except for students in the Teaching of Chemistry or Teacher Education Minor in Chemistry programs.

122. Elementary Quantitative Analysis

Theory and practice of equilibria pertinent to chemical analyses; practical applications of classical and instrumental methods of analysis. Intended primarily for students outside the School of Chemical Sciences. *Prerequisite:* CHEM 102 and 106 or equivalent. 3 hours. Students with credit in CHEM 122 cannot receive credit for CHEM 109, 223, or 224.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Cooperative Education: Planning

Same as CHE 201. On-campus planning and discussion of cooperative work-study education programs in industry and government. Each chemistry or chemical engineering student participating in the cooperative education program must register for CHEM/CHE 201 or 202 each term (201 if on-campus, 202 if off-campus). *Prerequisite:* Acceptance into the School of Chemical Sciences Cooperative Education Program. 0 hours.

202. Cooperative Education: Industrial Practice

Same as CHE 202. Off-campus cooperative practice of chemistry or chemical engineering in industrial or governmental facilities. Each chemistry or chemical engineering student participating in cooperative education must register for CHEM 202 for each off-campus term. *Prerequisite:* Acceptance into the School of Chemical Sciences Cooperative Education Program. 0 hours.

210. Chemistry Internship

Full-time practice of chemical science in an off-campus industrial setting or research laboratory environment. Summary report required. *Prerequisite:* Completion of freshman year or equivalent, or consent of Director of Cooperative Education in Chemistry. 0 hours. May be repeated in separate semesters. Approved for S/U grading.

223. Quantitative Analysis Lecture

Fundamentals of quantitative analysis, chemical equilibrium and kinetics. This lecture course is intended to accompany CHEM 224. *Prerequisite:* CHEM 102 and 106 or equivalent. 2 hours. Students with credit in CHEM 223 can receive credit for CHEM 109 but not for CHEM 122.

224. Quantitative Analysis Laboratory

Laboratory course covers the fundamentals of quantitative analysis, equilibrium and kinetics. *Prerequisite:* Credit or concurrent registration in CHEM 223. 1 hour. Students with credit

in CHEM 224 cannot receive credit for CHEM 109 or 122.

231. Elementary Organic Chemistry, I

Presents elementary structural and synthetic chemistry with emphasis on applications of this material to closely related areas. For students in agricultural, nutritional and biological sciences, as well as premedical, pre dental, and preveterinary programs. One-semester survey course; may be followed by CHEM 331. *Prerequisite:* CHEM 102 and 106, or 108. 3 hours. Students may not receive credit for both CHEM 231 and 236.

234. Elementary Organic Chemistry Laboratory, I

Basic laboratory techniques in organic chemistry are presented with emphasis on experiments of interest to closely related areas. For students in agricultural science, dairy technology, food technology, nutrition, dietetics, premedical, pre dental, and preveterinary programs. *Prerequisite:* Credit or concurrent registration in CHEM 231. 2 hours. Students may not receive credit for both CHEM 234 and CHEM 237.

236. Fundamental Organic Chemistry, I

Fundamental structural, synthetic, and mechanistic organic chemistry is presented. For students whose major is chemistry or for those in the specialized curricula in chemistry or chemical engineering. The first semester of a two-semester integrated sequence (to be followed by CHEM 336). This lecture course is intended to accompany CHEM 237. *Prerequisite:* CHEM 108, 122 or 223-224. 4 hours. Students may not receive credit for both CHEM 231 and 236.

237. Structure and Synthesis

Laboratory course introduces synthesis and the basic techniques for the separation, isolation and purification of organic and inorganic compounds. *Prerequisite:* Credit or concurrent registration in CHEM 236. 2 hours. Students may not receive credit for both CHEM 237 and 234.

245. Thermodynamics of Materials

Same as MATSE 301. See MATSE 301.

292. Senior Thesis

Research with thesis, under the direction of a senior staff member in chemistry. Normally the student takes two semesters of CHEM 292 in the senior year. CHEM 292 is recommended for all those who plan to do research and graduate study, and it or BIOCH 292 is a prerequisite for graduation with distinction in chemistry. In the semester preceding their initial enrollment, those interested in taking the course should consult with their advisers and with the graduate adviser for the area of interest in which they plan to work. A maximum of 10 hours may be counted toward graduation and a thesis must be presented for credit to be received. 2 to 6 hours. (Counts for advanced hours in L.A.S.)

315. Inorganic Chemistry

Basic chemical bonding in molecules; introduction to symmetry; chemistry of the main group elements; coordination chemistry of the

transition elements; organometallic chemistry; solid state chemistry; bioinorganic chemistry; chemistry of the lanthanide and actinide elements. *Prerequisite:* CHEM 237 (formerly 181). 3 hours or ¾ unit.

316. Inorganic Chemistry Laboratory

Emphasizes modern techniques for the synthesis, purification, and characterization of inorganic and organometallic compounds. There are three components to the course: lectures on laboratory methodology and reporting, laboratory experiments, and report writing. The final third of the course is dedicated to special individualized projects. *Prerequisite:* CHEM 319, or credit or concurrent registration in CHEM 315, or equivalent; for undergraduate students, completion of campus Composition I general education requirement. 3 hours or ¾ unit.

319. Instrumental Characterization of Chemical Systems Laboratory

Laboratory course emphasizes the application of modern instrumental techniques for characterizing the kinetic behavior and equilibrium properties of chemical systems. *Prerequisite:* Either CHEM 237 or both CHEM 234 and 224. Credit or concurrent registration in CHEM 321. 2 hours or ½ unit.

321. Instrumental Characterization of Chemical Systems

Lecture course covers the fundamentals of instrumental characterization including: nuclear magnetic resonance spectroscopy, potentiometry, voltammetry, atomic and molecular spectroscopy, mass spectrometry, activation analysis, electron and x-ray spectroscopy and gas and liquid chromatography. *Prerequisite:* CHEM 340; or credit or concurrent registration in CHEM 342; or consent of the instructor. 2 hours or ½ unit.

322. Separation Methods

Examines theory, practice, and instrumentation in gas and liquid chromatography, extraction techniques, mass spectrometry as coupled to chromatography, electrophoresis, and separations based on phase equilibria. *Prerequisite:* Credit or concurrent registration in CHEM 340 or 342. 4 hours or 1 unit.

323. Electronic Circuits, I

Same as PHYCS 343. See PHYCS 343.

331. Elementary Organic Chemistry, II

Second course; lectures covering topics in organic chemistry with special applications to the life sciences. *Prerequisite:* CHEM 231 and 234. 3 hours or ¾ unit. This course should not be taken by students who have completed CHEM 236. Students may not receive credit for both CHEM 331 and CHEM 336.

336. Fundamental Organic Chemistry II

Course is the second semester of a two-semester integrated sequence and should be taken the semester following enrollment in CHEM 236. *Prerequisite:* CHEM 236 and 237; students who have completed CHEM 231 and 234 (formerly 131 and 134) may be enrolled with consent of instructor. 3 hours or ¾ unit. Students may not receive credit for both CHEM 336 and CHEM 331.

337. Organic Chemistry

Laboratory experiments in organic chemistry with emphasis on synthesis. *Prerequisite:* CHEM 234 or 237 and credit or concurrent registration in CHEM 331 or 336. 3 hours or ¾ unit.

339. Advanced Organic Chemistry

Third course, lectures. Topics in structure, synthesis and reactions of organic chemistry. *Prerequisite:* CHEM 331 or 336. 3 hours or ¾ unit.

340. Principles of Physical Chemistry

One-semester course in physical chemistry emphasizing topics most important to students in the biological and agricultural sciences. Not open to students in the specialized curricula in chemistry and chemical engineering. Laboratory experience in this area provided by CHEM 319 to be taken preferably after CHEM 340. *Prerequisite:* CHEM 122 or 223 and CHEM 231, or equivalent; PHYCS 102; MATH 242 or equivalent (calculus including partial derivatives). 4 hours or 1 unit.

342. Physical Chemistry, I

Lectures and problems focusing on microscopic properties. CHEM 342 and 344 constitute a year-long study of chemical principles covering topics such as quantum chemistry, atomic and molecular structure and spectra, statistical thermodynamics, properties and thermodynamics of materials in gases, solids, and liquids, and chemical kinetics and equilibria. *Prerequisite:* CHEM 108, 122, or 223; MATH 225 or 315, and a minimal knowledge of differential equations, or equivalent; PHYCS 111, 112, and 114 or equivalent. 4 hours or 1 unit. Credit is not given for both CHEM 342 and PHYCS 361.

344. Physical Chemistry, II

Continuation of CHEM 342, focusing on bulk properties. *Prerequisite:* CHEM 342. 4 hours or 1 unit. Credit is not given for both CHEM 344 and PHYCS 361.

345. Physical Principles of Chemistry Laboratory, I

Laboratory course features experiments concerning the fundamental physical nature of chemical phenomena. Typical experiments include magnetic resonance and thermochemistry. *Prerequisite:* CHEM 319, and credit or concurrent registration in CHEM 344; or consent of instructor. 2 hours or ½ unit.

346. Physical Biochemistry

Same as BIOCH 346. See BIOCH 346.

347. Physical Principles of Chemistry Laboratory, II

Laboratory course features advanced experiments concerning the fundamental physical nature of chemical phenomena. This course is a continuation of CHEM 345. Typical experiments include dielectric constants of liquids and low-energy electron diffraction from surfaces. *Prerequisite:* CHEM 345 or consent of instructor. 2 hours or ½ unit.

348. Advanced Physical Chemistry

The sequence, CHEM 348 and 349, is designed to give seniors and graduate students a unified treatment of physical chemistry on an advanced level; topics include the electronic

structure and spectra of atoms, principles of wave mechanics, experimental and theoretical aspects of the chemical bond in diatomic and polyatomic molecules, statistical thermodynamics, and chemical kinetics. *Prerequisite:* CHEM 344 or equivalent. 4 hours or 1 unit.

349. Advanced Physical Chemistry
Continuation of CHEM 348. *Prerequisite:* CHEM 348. 4 hours or 1 unit.

357. Polymer Chemistry
Same as MATSE 357. See MATSE 357.

358. Polymer Physical Chemistry
Same as MATSE 358. See MATSE 358.

391. Special Topics in Chemical Science and Technology
Open to advanced undergraduates and graduate students. Deals with subjects not ordinarily covered by regularly scheduled courses. *Prerequisite:* Credit or concurrent registration in any 300-level course in chemistry. 2 or 3 hours, or ½ or ¾ unit.

392. Solid State Structural Analysis
Lectures and laboratory on various aspects of x-ray diffraction studies of solids; topics include the properties of crystals, symmetry, diffraction techniques, data collection methods, and the determination and refinement of crystal structures. *Prerequisite:* CHEM 342 or consent of instructor. 4 hours or 1 unit.

393. Fundamentals of Laboratory Safety
Same as MATSE 392. See MATSE 392.

402. Advanced Inorganic Chemistry
Descriptive chemistry of the main group and transition elements, reactions and reaction mechanisms of inorganic systems, and electronic structure of inorganic molecules and solids. *Prerequisite:* CHEM 315 or approval of instructor. 4 hours or 1 unit.

404. Advanced Inorganic Chemistry Laboratory
Specialized laboratory techniques; more difficult inorganic syntheses. *Prerequisite:* Credit or concurrent registration in one of the lecture courses in inorganic chemistry in the 400 series. ¼ to ¾ unit.

405. Inorganic Chemistry Seminar
Required of all graduate students whose major is inorganic chemistry. ¼ unit.

406. Physical Inorganic Chemistry
Includes group theory and use of physical methods to provide information about the geometry, electronic structures, and reactivity of inorganic compounds in solution; emphasizes NMR and ESR. *Prerequisite:* CHEM 344. 1 unit.

407. Special Topics in Inorganic Chemistry
Advanced course dealing with a subject not ordinarily covered by regularly scheduled courses, such as organometallic chemistry, advanced ligand field theory and molecular orbital theory of inorganic compounds, kinetics and mechanisms of inorganic reactions, etc. *Prerequisite:* CHEM 406 or consent of instructor. ½ to 1 unit. May be repeated for credit.

420. Advanced Analytical Chemistry
Treatment of the basic issues of importance in modern analytical chemistry. Topics include basic chemical and measurement concepts, measurement instrumentation and techniques, and principles, tools, and applications in spectroscopy, electrochemistry, separations, sensors, mass spectroscopy and surface characterization. *Prerequisite:* CHEM 319, 321, and 344. ¾ unit.

421. Experimental Spectroscopy
Principles and applications of spectroscopic measurements and instrumentation. Atomic and molecular absorption, emission, fluorescence, and scattering, emphasizing physical interpretation of experimental data. *Prerequisite:* General physics and chemistry equivalent to a major in physical sciences for a bachelor's degree. 1 unit.

422. Principles of Electrochemistry and Electroanalysis
Structure of the metal solution interface. Electrochemical and physical methods for probing metal/solution interface. Electroanalysis. Principles of electrochemical instrumentation for electroanalysis. Electrode materials. Electrochemical surface science and electrocatalysis. *Prerequisite:* General physics and chemistry equivalent to a major for a bachelor's degree. 1 unit.

424. Special Topics in Analytical Chemistry
Recent advances in measurement science and the application of analytical chemistry to other sciences; designed to acquaint students with techniques and applications not covered in other courses. *Prerequisite:* Consent of instructor. ½ unit. May be repeated.

425. Analytical Chemistry Seminar
Required of all graduate students whose major is analytical chemistry. ¼ unit.

430. Advanced Organic Chemistry: Structure and Spectroscopy
Advanced survey of organic chemistry with emphasis on structure and spectroscopy. *Prerequisite:* CHEM 331 or 336. 1 unit.

431. Advanced Organic Chemistry: Physical Organic Chemistry
Advanced survey of organic chemistry with emphasis on reaction mechanisms and concepts of physical organic chemistry. *Prerequisite:* CHEM 331 or 336 and one year of physical chemistry. 1 unit.

432. Advanced Organic Chemistry: Synthesis
Advanced survey of organic chemistry with emphasis on synthesis. *Prerequisite:* CHEM 331 or 336. 1 unit.

433. Special Topics in Organic Chemistry
Special topics in organic chemistry. Advanced course dealing with a subject not ordinarily covered by regularly scheduled courses, such as natural product synthesis and biosynthesis, organic photochemistry, chemistry of special families of organic compounds, etc. *Prerequisite:* CHEM 431 and 432, one of which may be taken concurrently. ½ or ¾ unit. Two lectures per week are required for ¾ unit credit. May be repeated for credit.

435. Organic Chemistry Seminar
Current literature in organic chemistry. *Prerequisite:* Consent of instructor. ½ unit.

436. Introduction to Organic Chemistry Research
Lecture course on research techniques in organic chemistry. *Prerequisite:* Consent of instructor. ¼ unit.

440. Research Topics in Biophysical Chemistry
Same as BIOCH and BIOPH 440. Topics of importance in research in biophysical chemistry are discussed with emphasis on physical background and current applications; topics may be chosen from among the following: NMR and ESR spectra of biological macromolecules; x-ray diffraction studies of macromolecules; kinetics and statistical mechanics of helix coil transitions; physical approaches to the refolding and assembly of multisubunit proteins; fluorescence spectroscopic studies on macromolecules; and light scattering from macromolecules in solution. *Prerequisite:* CHEM 344 or equivalent, or CHEM 346. 1 unit.

441. Thermodynamics and Statistical Thermodynamics
Fundamentals of classical thermodynamics with emphasis on equilibrium and stability criteria; an introduction to equilibrium statistical mechanics with discussion of several ensembles and applications to ideal systems of interest to chemists; and introduction to nonequilibrium thermodynamics. *Prerequisite:* CHEM 342 and 344, or equivalent. 1 unit.

442. Statistical Mechanics
Fundamentals of equilibrium statistical mechanics with selected applications to interacting classical fluids: dense gases, solutions, liquids, plasmas, and ionic solutions; introduction to nonequilibrium statistical mechanics and linear response theory. *Prerequisite:* CHEM 348 and 441, or equivalent, or consent of instructor. 1 unit.

443. Quantum Dynamics
The quantum mechanical description of time-dependent processes, including discussions of the time-dependent Schrödinger equation, approximations, interaction of matter with radiation, wave packets, elastic and inelastic scattering, and relaxation phenomena. *Prerequisite:* Concurrent registration in CHEM 348 or consent of instructor. 1 unit.

445. Physical Chemistry Seminar
Required of all graduate students whose major is physical chemistry. *Prerequisite:* Consent of instructor. ¼ or ½ unit.

446. Molecular Electronic Structure
Theoretical basis of the electronic structure of atoms and molecules; molecular orbital concepts and self-consistent field theory; angular momentum and the full rotation group; electron correlation effects; and applications to electronic spectroscopy of organic molecules, detailed descriptions of chemical reactions, and molecular properties. *Prerequisite:* CHEM 348. 1 unit.

448. Chemical Kinetics

Theoretical and experimental topics in chemical kinetics and chemical dynamics; topics include relation between rates and mechanisms of chemical reactions, collision theory of reaction rates, activated complex theory, theory of unimolecular processes, classical dynamics of reactive scattering, elastic scattering, quantum theory of inelastic scattering or equivalent curve crossing processes, and experimental methods. *Prerequisite:* CHEM 344. 1 unit.

449. Special Topics in Physical Chemistry

Advanced course dealing with a subject not ordinarily covered by regularly scheduled courses, such as molecular spectroscopy, statistical mechanics, radiation and hot-atom chemistry, molecular quantum mechanics, radio-frequency spectroscopy, advanced experimental methods, kinetics of irreversible processes and cooperative phenomena, etc. *Prerequisite:* Consent of instructor. ½ or 1 unit. May be repeated.

467. Chemical Kinetics and Catalysis

Same as CH E 467. CH E 467.

486. Surface Chemistry

Same as CH E 486. See CH E 486.

490. Special Topics in Chemistry

Designed for students majoring or minoring in chemistry who wish to undertake individual studies of a nonresearch nature under the direction of a faculty member of the department. *Prerequisite:* Consent of instructor and written approval of department head. Staff for the course is the same as for CHEM 499. ¼ to 1 unit.

496. Isotopically Labeled Compounds in Chemistry and Biology

Variable credit course consisting of 2 parts: first half is a practical study of the most commonly used radioisotopes, including procedures for their safe handling (taught jointly with the first half of V B 463); last half of course covers the synthesis and analysis of isotopically labeled compounds using both radioisotopes and stable isotopes. Course credit is ½ (for the first half only) or 1 unit (for the entire course). *Prerequisite:* CHEM 336. ½ or 1 unit. Students may not receive credit for this course and BIOPH, V B, or ANSCI 463.

499. Thesis Research

Candidate for the master's degree who elects research is required to present a thesis. A thesis is always required of students working toward the degree of Doctor of Philosophy. Not all candidates for thesis work necessarily are accepted. Any student whose major is in a department other than chemistry or chemical engineering must receive permission from the head of the Department of Chemistry to register in this course. 0 to 4 units.

CHINESE

(See East Asian Languages and Cultures)

CINEMA STUDIES

Acting Director: David M. Desser

Office Address: 3092 Foreign Language Building, 707 South Mathews Avenue, Urbana

Phone: 333-3356

URL: www.uiuc.edu/unit/cinema

Cinema Studies (CINE)**117. Shakespeare on Film and Videotape: From Text to Screen**

Same as ENGL 117. See ENGL 117.

193. Undergraduate Seminar in Cinema Studies

Topics vary. Consult *Timetable* or Unit for Cinema Studies. 1 to 3 hours. May be repeated to a maximum of 6 hours as topics vary.

200. Topics in Film and History

Same as HIST 200. See HIST 200.

261. Survey of World Cinema, I: The Beginnings through the Coming of Sound
Survey of the development of equipment, techniques, and themes of the cinema from its origins through the coming of sound; lectures, discussions, and showings of selected films. 3 hours.

262. Survey of World Cinema, II: The Thirties to the Present

Survey of the development of equipment, techniques, and themes of the cinema from the coming of sound to the present; lectures, discussions, and showings of selected films. 3 hours.

285. The Jewish Experience in Film

Selected topics focusing on various aspects of Judaism and Jewish culture as it has been portrayed in world cinema along with an examination of the contributions of selected Jewish artists to the cinema. *Prerequisite:* One college course in literature or cinema studies. 3 hours.

301. Philosophy and Film

Same as PHIL 301. See PHIL 301.

319. Studies in Russian and East European Cinema

Same as COMM, SLAV, and SPCOM 319. See SLAV 319.

361. Film Theory and Criticism

Study of major aesthetic and critical theories about film; study of theory and practice of film

criticism. *Prerequisite:* One cinema studies course at the 200 or 300 level and one college course in literature, or consent of instructor. 3 hours or 1 unit.

366. Japanese Cinema

Same as EALC 366. Examines the influence of Japan's traditional aesthetics on its cinema and surveys its major film movements, genres, and directors. *Prerequisite:* Two college level courses in cinema studies or East Asian Languages and Cultures, or graduate standing. 3 hours or 1 unit.

388. French and Comparative Cinema, I

Same as C LIT, FR, and HUMAN 388. See FR 388.

389. French and Comparative Cinema, II

Same as C LIT, FR, and HUMAN 389. See FR 389.

390. The Films of Ingmar Bergman

Same as SCAN 390. See SCAN 390.

391. The German Cinema

Same as GER 390. See GER 390.

392. Swedish Cinema

Same as SCAN 392. See SCAN 392.

CINEMATOGRAPHY

(See Art and Design, School of)

CIVIL AND ENVIRONMENTAL ENGINEERING

Head of Department: David E. Daniel

Department Office: 1114 Newmark Civil Engineering Laboratory, 205 North Mathews Avenue, Urbana

Phone: 333-8038

URL: www.ce.uiuc.edu

Civil and Environmental Engineering (CEE)**195. Introduction to Civil Engineering**

Civil engineering orientation course including historical developments, educational requirements, relation to science, professional practice, and specialties within the profession. *Prerequisite:* Sophomore standing in civil engineering. 0 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Engineering Surveying

Introduction to surveying and photogrammetry. *Prerequisite:* CEE 293; credit or concurrent registration in C S 101. 4 hours.

205. Route Surveying and Design

Principles for the design and layout of routes; coverage includes horizontal and vertical alignment, route location, earthwork, computation, ground and photogrammetric survey methods, and special survey methods for highways, railroads, pipelines, tunnels and urban construction. *Prerequisite:* CEE 201 or consent of instructor. 3 hours.

210. Mechanical Behavior of Materials

Same as T A M 224. See T A M 224.

216. Construction Engineering

Introduction to the construction processes: contracting and bonding, planning and scheduling, estimating and project control, productivity models, and construction econometrics. *Prerequisite:* CEE 292; credit or concurrent registration in C S 101 and CEE 293. 3 hours.

220. Introduction to Transportation Engineering

An introduction to the design, planning, operation, management, and maintenance of transportation systems. Principles for planning integrated multimodal transportation systems (highways, air, rail, etc.) are presented. Introduction is provided on the layout of highways, airports, and railroads with traffic flow models, capacity analysis, and safety. Functional design concepts are introduced for both the facilities and systems areas of study with life cycle costing procedures and criteria for optimization. *Prerequisite:* T A M 221; CEE 293 or concurrent registration. 3 hours.

241. Environmental Quality Engineering

Considers the sources, characteristics, transport, and effects of air and water contaminants; biological, chemical, and physical processes in water; atmospheric structure and composition; unit operations for air and water quality control; solid waste management; and environmental quality standards. *Prerequisite:* CHEM 102. 3 hours.

255. Introduction to Hydrosystems Engineering

Quantitative aspects of water in the earth's environment and its engineering implications, including design and analysis of systems directly concerned with use and control of water; presents a quantitative introduction to hydrology, hydraulic engineering, and water resources planning. *Prerequisite:* CEE 293 or a course in probability or statistics; credit or concurrent registration in T A M 235 and CEE 292, or equivalent. 3 hours.

261. Introduction to Structural Engineering

Basic topics in the analysis, behavior and design of trusses and framed structures under static loads; analysis topics include member forces in trusses, shear and moment diagrams, deflections, simple applications of the force method and slope-deflection; and an introduction to computer applications by means of a general purpose structural analysis program. *Prerequisite:* T A M 221. 3 hours.

263. Behavior and Design of Metal Structures, I

Introduction to the design of metal structures; behavior of members and their connections; and theoretical, experimental, and practical bases for proportioning members and their connections. *Prerequisite:* CEE 261. 3 hours.

264. Reinforced Concrete Design, I

Study of the strength, behavior, and design of reinforced concrete members subjected to moments, shear, and axial forces; extensive discussion of the influence of the material properties on behavior. *Prerequisite:* CEE 261. 3 hours.

280. Introduction to Soil Mechanics and Foundation Engineering

Classification of soils, compaction in the laboratory and in the field, soil exploration, boring and sampling, permeability of soils, one-dimensional settlement analyses, strength of soil, introduction to foundations. *Prerequisite:* T A M 221. 3 hours.

284. Geotechnical Engineering

Introduction to applied problems in Geotechnical Engineering: analysis and design of foundations, bearing capacity and settlement of foundations; stability of excavations and slopes; ground movements due to construction; analysis and design of excavations, retaining walls, slopes and underground structures in soil and rock. *Prerequisite:* CEE 280. 3 hours.

292. Planning, Design, and Management of Civil Engineering Systems

Introduction to the formulation and solution of civil engineering problems. Major topics are: engineering economy, mathematical modeling, and optimization. Techniques, including classical optimization, linear and nonlinear programming, network theory, critical path methods, simulation, decision theory, and dynamic programming are applied with the aid of personal computers to a variety of civil engineering problems. *Prerequisite:* MATH 130, and credit or concurrent registration in MATH 225. 3 hours.

293. Engineering Modeling Under Uncertainty

Identification and modeling of nondeterministic problems in civil engineering, and the treatment thereof relative to engineering design and decision making. Development of stochastic concepts and simulation models, and their relevance to real design and decision problems in various areas of civil engineering. *Prerequisite:* MATH 130; credit or concurrent registration in MATH 242 recommended. 3 hours.

295. Professional Practice

Series of lectures by outstanding authorities on the practice of civil engineering and its relations to economics, sociology, and other fields of human endeavor. Lectures are given approximately once a week. *Prerequisite:* Junior standing. 0 hours.

314. Properties and Behavior of Concrete

Examines the influence of constituent materials (cements, aggregates and admixtures) on the properties of fresh and hardened concrete; mix design handling and placement of con-

crete; and behavior of concrete under various types of loading and environment; test methods. Laboratory practice is an integral part of the course. *Prerequisite:* CEE 210. 3 hours or $\frac{3}{4}$ unit.

315. Construction Productivity

Introduction of the application of scientific principles to the measurement and forecasting of productivity in construction engineering. Conceptual and mathematical formulation of the labor, equipment, and material factors affecting productivity. *Prerequisite:* CEE 216 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

316. Construction Planning and Control

Project definition; scheduling and control models; material, labor and equipment allocation; optimal schedules; project organization; documentation and reporting systems; and management and control. *Prerequisite:* CEE 216 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

318. Construction Cost Analyses and Estimates

Introduction to the application of scientific principles to costs and estimates of costs in construction engineering; concepts and statistical measurements of the factors involved in direct costs, general overhead costs, cost mark-ups and profits; and the fundamentals of cost recording for construction cost accounts and cost controls. *Prerequisite:* CEE 216 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

320. Pavement Analysis and Design, I

Analysis, behavior, performance, and structural design of pavements for highways and airfields; topics include climate factors, agricultural, life cycle design economics, and traffic loadings. *Prerequisite:* CEE 220 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

321. Bituminous Materials and Mix Design

Properties and control testing of bituminous materials, aggregates for bituminous mixtures, and analysis and design of asphalt concrete and liquid asphalt cold mixtures; structural properties of bituminous mixes; surface treatment design; and recycling of mixtures. *Prerequisite:* CEE 220 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

322. Development of Highway Facilities

Analysis of factors in developing a highway transportation facility; traffic estimates and assignment; problems of highway geometrics and design standards; planning and location principles; intersection design factors; street systems and terminal facilities; programming improvements; drainage design; structural design of surface; concepts of highway management and finance; and highway maintenance planning. *Prerequisite:* CEE 220 or consent of instructor. 4 hours or 1 unit.

325. Highway Traffic Analysis and Design

Study of fundamentals of traffic engineering; analysis of traffic stream characteristics; capacity of urban and rural highways; design and analysis of traffic signals and intersections; traffic control; traffic impact studies; and traffic accidents. *Prerequisite:* CEE 220 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

330. Urban Transportation Planning

Same as U P 330. See U P 330.

334. Airport Facilities Design

Basic principles of airport facilities design to include aircraft operational characteristics, noise, site selection, land use compatibility, operational area, ground access and egress, terminals, ground service areas, airport capacity, and special types of airports. *Prerequisite:* Senior standing in CEE, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

336. Hazardous Waste Management

Analysis of the sources, characteristics, and environmental and health effects of hazardous wastes. Legislative and regulatory controls. Biological, chemical, and thermal destruction of hazardous materials. Land disposal of solid residues. Contaminated site clean-up. *Prerequisite:* CEE 342, and CEE 344 or equivalent. 3 hours or $\frac{3}{4}$ unit.

337. Managing Wastewaters in Aquatic Ecosystems

Examines the characteristics of rivers and lakes which affect the management of domestic and industrial wastewaters; includes assessment of chemical hazards, and introduction to surveillance and biomonitoring, and a review of regulations governing effluents. *Prerequisite:* CEE 241 or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

338. Biomonitoring: Design, Analysis, and Interpretation

Discusses the theory and application of biomonitoring as a component of environmental management; reviews a range of techniques to analyze effluents and assess condition and trend in the environment, using biological and ecological systems; and emphasizes biomonitoring program design, selection and analysis of data, and interpretation of biomonitoring results. *Prerequisite:* CEE 337 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

339. Environmental Systems Analysis, I

Examination of principles of environmental engineering design: applications to mathematical methods, including single and multi-objective programming, to environmental systems; economic analysis, including benefit-cost; and management strategies. *Prerequisite:* CEE 292; and CEE 342 or 349. 3 hours or $\frac{3}{4}$ unit.

340. Physical Principles of Environmental Engineering Processes

Analysis of the physical principles which form the basis of many water and air quality-control operations; sedimentation, filtration, inertial separations, flocculation, mixing and principles of reactor design. *Prerequisite:* CEE 342 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

341. Regional Environmental Management Simulation

Same as ACE 319, ENVST and GEOG 341, and U P 375. Simulation of environmental, political, and economic problems facing a midwestern community. Students assume the responsibilities of planners, environmental quality managers, lawyers, business managers, land developers, and other roles and interact to resolve these problems. Introduces practical

procedures and decisions that public servants, lawyers, engineers, business persons, and citizens in general confront with regard to the environment. *Prerequisite:* Senior or graduate standing, or consent of instructor and credit in an introductory course in pollution control. 2 hours or $\frac{1}{2}$ unit.

342. Water Quality Control Processes

Fundamental theory underlying the unit processes utilized in the treatment of water for domestic and industrial usage, and in the treatment of domestic and industrial wastewaters. *Prerequisite:* CEE 241; credit or concurrent registration in T A M 235. 3 hours or $\frac{3}{4}$ unit.

343. Chemical Principles of Environmental Engineering Processes

Application of principles of chemical equilibrium and chemical kinetics to air and water quality. Chemistry topics are thermodynamics, kinetics, acid/base chemistry, complexation, precipitation, dissolution, and oxidation/reduction. Specific applications include batch reactors, alkalinity, acidity, buffers, the carbonate system, solubility, water stability, corrosion, and disinfectants. *Prerequisite:* CEE 342 or consent of instructor. 2 or 4 hours, or $\frac{1}{2}$ or 1 unit. Students taking the course for 4 hours or 1 unit enroll for the entire semester; students taking the course for 2 hours or $\frac{1}{2}$ unit take only the first half of the semester.

344. Solid Waste Management

Analysis of the sources, quantities, and characteristics of solid waste; effect of refuse on the environment; establishment and operation of collection and transportation systems; material recovery systems; energy recovery systems; ultimate disposal systems. A term project is required of all graduate students. *Prerequisite:* CEE 241 or consent of instructor. 3 hours or 1 unit.

345. Atmospheric Dispersion Modeling

Application of the fundamentals of meteorology to air pollution problems including the transport and diffusion of particulate matter, aerosols and gases; precipitation processes and rain-out; behavior of stack effluents; effects of pollutants in the atmosphere. *Prerequisite:* T A M 235 and M E 205, or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

346. Biological Principles of Environmental Engineering Processes

Application of principles of biochemistry and microbiology to air and water quality, wastes, and their engineering management; biological mediated changes in water and in domestic and industrial wastewater. *Prerequisite:* CEE 343 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

347. Stream Ecology

Same as EEE 359. Description of physical, chemical, and biological characteristics in streams and rivers including an integrated study of the environmental factors affecting the composition and distribution of biota; emphasizes the application of ecological principles in aquatic ecosystem protection and management. *Prerequisite:* CEE 337 or EEE 212, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

348. Atmospheric Chemistry

Same as ENVST 348. Examines the evolution of the atmosphere from its initial formation to its natural background condition to its current state perturbed by human activities; atmospheric chemistry of carbon, nitrogen, and sulfur; atmospheric aerosol and heterogeneous reactions; material transport; stratospheric ozone and its depletion; airborne radioactivity and atmospheric ion chemistry. *Prerequisite:* M E 207, CHEM 340, or ATMOS 301, or equivalent; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

349. Air Resources Engineering

Introduction to air pollution; includes the basis for air quality criteria, classification of sources, and the design of systems to control air pollution from stationary sources. *Prerequisite:* CEE 241; credit or concurrent registration in T A M 235. 3 hours or $\frac{3}{4}$ unit.

350. Surface Water Hydrology

Study of descriptive and quantitative hydrology dealing with the distribution, circulation, and storage of water on the earth's surface; discusses principles of hydrologic processes and presents methods of analysis and their applications to engineering and environmental problems. *Prerequisite:* CEE 255 or equivalent with consent of instructor. 3 hours, or $\frac{3}{4}$ unit.

351. Hydromechanics

Incompressible fluid mechanics with particular emphasis on topics in analysis and applications in civil engineering areas; primary topics include principles of continuity, momentum and energy, kinematics of flow and stream functions, potential flow, laminar motion, turbulence, and boundary-layer theory. *Prerequisite:* T A M 235 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

353. Analysis and Design of Hydraulic Systems

Hydraulic analysis and design of engineering systems: closed conduits and pipe networks; hydraulic structures, including spillways, stilling basins, and embankment seepage; selection and installation of hydraulic machinery. *Prerequisite:* T A M 235 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

356. Hydraulics of Surface Drainage

Hydraulic analysis and design of urban, highway, airport, and small rural watershed drainage problems; discussion of overload and drainage channel flows; hydraulics of storm-drain systems and culverts; determination of design flow; runoff for highways, airports, and urban areas; design of drainage gutters, channels, sewer networks, and culverts. *Prerequisite:* CEE 255 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

357. Groundwater

Physical properties of groundwater and aquifers, principles and fundamental equations of porous media flow and mass transport, well hydraulics and pumping test analysis, role of groundwater in the hydrologic cycle, groundwater quality and contamination. *Prerequisite:* CEE 255 and T A M 235, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

361. Methods of Structural Analysis

Direct stiffness method of structural analysis; fundamentals and algorithms; numerical analysis of plane trusses, grids and frames; virtual work and energy principles; introduction to the finite element method for plane stress and plane strain. *Prerequisite:* CEE 261. 4 hours or 1 unit.

363. Behavior and Design of Metal Structures, II

Metal members under combined loads; connections, welded and bolted; moment-resistant connections; plate girders, conventional behavior, and tension field action. *Prerequisite:* CEE 263. 3 hours, or $\frac{3}{4}$ or 1 unit.

364. Reinforced Concrete Design, II

Study of the strength, behavior, and design of indeterminate reinforced concrete structures, with primary emphasis on slab systems; emphasis on the strength of slabs and on the available methods of design of slabs spanning in two directions, with or without supporting beams. *Prerequisite:* CEE 264. 3 hours, or $\frac{3}{4}$ or 1 unit.

365. Design of Structural Systems

The whole structural design process including definition of functional requirements, selection of structural scheme, formulation of design criteria, preliminary and computer-aided proportioning, and analysis of response, cost, and value. *Prerequisite:* Credit in either CEE 263 or 264 with concurrent registration in the other. 3 hours or 1 unit.

367. Masonry Structures

Introduction to analysis, design and construction of masonry structures. Mechanical properties of clay and concrete masonry units, mortar, and grout. Compressive, tensile, flexural, and shear behavior of masonry structural components. Strength and behavior of unreinforced bearing walls. Detailed design of reinforced masonry beams, columns, structural walls with and without openings, and complete lateral-force resisting building systems. *Prerequisite:* CEE 264 or first course in reinforced concrete design. 3 hours, or $\frac{3}{4}$ to 1 unit.

368. Prestressed Concrete

Study of strength, behavior, and design of prestressed reinforced concrete members and structures, with primary emphasis on pretensioned, precast construction; emphasis on the necessary coordination between design and construction techniques in prestressing. *Prerequisite:* CEE 264. 3 hours, or $\frac{3}{4}$ or 1 unit.

369. Behavior and Design of Wood Structures

Mechanical properties of wood, stress grades and working stresses; effects of strength-reducing characteristics, moisture content, and duration of loading and causes of wood deterioration; glued-laminated timber and plywood; behavior and design of connections, beams, and beam-columns; design of buildings and bridges; other structural applications: trusses, rigid frames, arches, and pole-type buildings; and prismatic plates and hyperbolic paraboloids. *Prerequisite:* CEE 261 and one of: CEE 263, or 264. 3 hours, or $\frac{3}{4}$ or 1 unit.

374. Introduction to Structural Dynamics

Analysis of the dynamic response of structures and structural components to transient loads and foundation excitation; single-degree-of-freedom and multidegree-of-freedom systems; response spectrum concepts; simple inelastic structural systems; and introduction to systems with distributed mass and flexibility. *Prerequisite:* T A M 212; MATH 285; CEE 261, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. Credit is not given for both CEE 374 and T A M 311.

375. Welding and Joining Processes

Same as MATSE and MET E 344. See MATSE 344.

378. Introduction to the Design of Ocean Structures

Introduction to design and construction of civil engineering structures in the ocean and to associated engineering operations; principal topics include water wave mechanics, engineering oceanography, wave and current forces, and design considerations for fixed and floating structures. *Prerequisite:* T A M 235; CEE 261; CEE 293. 3 hours, or $\frac{3}{4}$ or 1 unit.

379. Applied Structural Mechanics

Study of beams under lateral load; beams with combined lateral load and thrust; beams on elastic foundations; applications of Fourier series and virtual work principles to beam-type structures; stress and strain in three dimensions; applications to flexure of beams and plates; elements of the engineering theory of plates; and torsion of thin-walled open sections. *Prerequisite:* MATH 285. 3 hours, or $\frac{3}{4}$ or 1 unit.

383. Soil Mechanics and Soil Behavior

Composition and structure of soil; water flow and hydraulic properties; stress in soil; compressibility behavior and properties of soils; consolidation and settlement analysis; shear strength of soils; compaction and unsaturated soils; experimental measurements. *Prerequisite:* CEE 280 or equivalent, or consent of instructor. 4 hours or 1 unit.

384. Applied Soil Mechanics

Application of soil mechanics to earth pressures and retaining walls, stability of slopes, foundations for structures, excavations; construction considerations; instrumentation. *Prerequisite:* CEE 383 or equivalent. 4 hours or 1 unit.

391. Computer Methods in Civil Engineering

Same as CSE 315. Review of programming concepts; formulation and programming of numerical, data processing, and logical problems with applications from various branches of civil engineering; organization of programs and data; and development and use of problem-oriented programming languages in civil engineering. *Prerequisite:* C S 101 or equivalent; senior or graduate standing in civil engineering; or consent of instructor. 3 hours or 1 unit.

393. Engineering Decision and Risk Analysis

Development of modern statistical decision theory and risk analysis, and application of these concepts in civil engineering design and

decision making; Bayesian statistical decision theory, decision tree, utility concepts, and multi-objective decision problems; modeling and analysis of uncertainties, practical risk evaluation, and formulation of risk-based design criteria, risk benefit trade-offs, and optimal decisions. *Prerequisite:* CEE 293 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ to 1 unit.

397. Independent Study in Civil Engineering

Individual investigations or studies of any phase of civil engineering selected by the student and approved by the department. *Prerequisite:* Senior or graduate standing. 1 to 4 hours, or 0 to 4 units.

398. Civil Engineering Special Topics

Structured presentations of new and developing areas of knowledge in civil engineering offered by the faculty to augment the formal courses available. *Prerequisite:* Individually identified for each offering under this course number; see Timetable. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

410. Advanced Topics in Construction Materials

Lectures and discussions related to advanced topics in the science and technology materials used in civil engineering construction. *Prerequisite:* As specified for each section, or consent of instructor. It is expected that each section will require a 300-level course as a prerequisite or co-requisite. $\frac{1}{4}$ to 1 unit. May be repeated in the same or separate semesters to a maximum of 4 units.

416. Systems Analysis, I: Systems Methodology and Network Techniques

Same as I E 416. See I E 416.

420. Pavement Analysis and Design, II

Development of models for and analysis of pavement systems; use of transfer functions relating pavement response to pavement performance; evaluation and application of current pavement design practices and procedures; analysis of the effects of maintenance activities on pavement performance; and economic evaluation of highway and airport pavements. *Prerequisite:* CEE 320. 1 unit.

421. Pavement Evaluation, Maintenance, and Agricultural

Concepts and procedures for condition survey rating; evaluation by nondestructive testing (roughness, skid resistance, structural capacity); and destructive testing, maintenance strategies, and rehabilitation of pavement systems for highways and airfields. *Prerequisite:* CEE 320. 1 unit.

423. Highway Materials Stabilization

Stabilization of aggregates and soils with cement, lime, bituminous materials, and other stabilizing agents; emphasis on basic stabilization reactions, properties of stabilized materials, and composition design. *Prerequisite:* CEE 220 or consent of instructor. 1 unit.

424. Transportation Soils Engineering

Occurrence and properties of surficial soils, soil classification systems, soil variability;

subgrade evaluation procedures, repeated loading behavior of soils; soil compaction and field control; soil moisture, soil temperature, and frost action; soil trafficability and subgrade stability for transportation facility engineering. *Prerequisite:* CEE 383 or equivalent. 1 unit.

439. Environmental Systems Analysis, II
Examination of advanced topics in environmental systems analysis with emphasis on the mathematical modeling of water quality systems and multi-objective programming methods of analysis. Large scale optimization models and inter-relationships between water quality and water quantity analyses, e.g., reservoir operation. *Prerequisite:* CEE 339. 1 unit.

440. Processes for Water Quality Control, I
Theory and basic design of processes used in water and wastewater treatment, including adsorption, ion exchange, chemical oxidation and reduction, disinfection, sedimentation, filtration, coagulation, flocculation, and chemical precipitation. *Prerequisite:* Credit or concurrent registration in CEE 340 and 343, or consent of instructor. 1 unit.

441. Modeling of Water Quality in Natural Systems
Same as CSE 464. Studies mathematical modeling of the movement and fate of pollutants and other substances in streams, lakes, and other natural water bodies; the emphasis is on the development of practical models of aquatic systems. *Prerequisite:* CEE 340 or 351. 1 unit.

442. Processes for Water Quality Control, II
Theory and its application for design and operation of processes used in water and wastewater treatment; emphasis is on biological treatment processes and related processes for gas transfer, sludge dewatering, sludge disposal, and solids separations. *Prerequisite:* CEE 340 and 343, and credit or concurrent registration in CEE 346, or consent of instructor. 1 unit.

443. Unit Operations in Environmental Engineering
Experimental and pilot plant studies of unit operations and unit processes in environmental engineering, emphasizing water treatment and wastewater treatment; evaluation of parameters for the design of biological waste treatment units; determination of chemical requirements for water treatment processes; and studies of anaerobic digestion. *Prerequisite:* CEE 440 or credit or concurrent registration in CEE 442, or consent of instructor. 1 unit.

448. Control of Air Pollution from Stationary Sources
Same as ME 411. Study of the basic theory of pollution control devices and their application to air pollution control problems. *Prerequisite:* Credit or concurrent registration in CEE 340 and 343, or consent of instructor. 1 unit.

449. Techniques and Instrumentation in Air Sampling
Same as ENVST 449. Studies principles of sampling for particles and gases in the field of air pollution; examines instrumental techniques relevant to the design of sampling systems used in process control, ambient air

monitoring and laboratory experiments; methods of sample analysis and their limitations. *Prerequisite:* MATH 285 and CEE 349; or consent of instructor. 1 unit.

450. Advanced Hydrologic Modeling
Application of deterministic and probabilistic concepts to simulate and analyze hydrologic systems; discussion of the theory and application of linear and nonlinear, lumped, and distributed systems techniques in modeling the various phases of the hydrologic cycle. *Prerequisite:* CEE 350 or consent of instructor. 1 unit.

451. Open-Channel Hydraulics
Advanced hydraulics of free surface flow in rivers and open channels; discussion of theory, analytical and numerical solution techniques, and their applications to gradually and rapidly varied nonuniform flows, unsteady flow, and flow in open-channel networks. *Prerequisite:* CEE 351 or equivalent. 1 unit.

455. Transport Processes in Water
Physical processes involved in transport of pollutants by water; turbulent diffusion and longitudinal dispersion in rivers, pipes, lakes, and the ocean; diffusion in turbulent jets, buoyant jets, and plumes. *Prerequisite:* MATH 280 and 285, and T A M 235, or consent of instructor. 1 unit.

457. Modeling of Groundwater Flow and Solute Transport
Same as CSE 465. Examines theory and application of numerical methods, finite differences and finite element, for solving the equations of groundwater flow and solute transport; transport of chemically reacting solutes; model calibration and verification. *Prerequisite:* CEE 357 or consent of instructor; MATH 285 or equivalent. 1 unit.

459. Sediment Transport
Physical processes of transportation and deposition of sediment particles in liquid bodies with particular emphasis on fluvial sediment problems; sediment in desilting basins; reservoirs and delta formation; erosion; stable channel design; and river porphology. *Prerequisite:* CEE 451 or consent of instructor. 1 unit.

465. Behavior of Structural Metal Frameworks
Theories of ultimate behavior of metal structural members with emphasis on buckling and stability of members and frames; theory of torsion applied to beam torsion, lateral-torsional buckling, curved beams with emphasis on design criteria; post-buckling strength of plates and post-buckling versus column behavior. *Prerequisite:* CEE 363. 1 unit.

466. Behavior of Reinforced Concrete Members
In-depth study of the behavior of reinforced concrete members, including the relationships between behavior and building code requirements. *Prerequisite:* CEE 264. 1 unit.

467. Behavior of Reinforced Concrete Structures
Study of the strength and behavior of assemblages of reinforced concrete members, including a study of the applicability of traditional elastic design procedures to structures which exhibit inelastic behavior under the influence of both short and long term loadings. *Prerequisite:* CEE 466. 1 unit.

469. Thin Shell Structures
Fundamental membrane and bending theories of shells; application of theories to analysis and design of folded plates and cylindrical, rotational, and translational shells; membrane stresses and deflections; and approximate bending solutions by variational, finite-difference, and finite-element methods. *Prerequisite:* CEE 473 or consent of instructor. 1 unit.

473. Theory of Plates
Classical plate bending theory; emphasis on methods of solution including series expansions, variational procedures, and finite element techniques applicable to plate-type structures commonly encountered in practice; consideration of inplane loads, large deflections, buckling, and anisotropy. *Prerequisite:* MATH 285. 1 unit.

475. Steel Structures: Fatigue and Fracture
Examines fatigue and fracture behavior of steel structures and connections; discusses relevant fatigue and fracture mechanics theory and experimental data and applies them to an assessment of behavior and current design specification practice. *Prerequisite:* CEE 363. 1 unit.

477. Probabilistic Bases for Structural Loads and Design
Application of probabilistic methods in describing and defining loads on structures with emphasis on the random fluctuation in time and space. Introduction to random vibration methods and applications to dynamic response of structures under wind and earthquake loads. Computer simulation of structural loads and responses. Probability-based safety criteria and review of current methods of selection of design loads and load combinations. *Prerequisite:* CEE 293 and 374, or equivalent, or consent of instructor. 1 unit.

478. Finite Element Methods in Solid and Structural Mechanics
Same as CSE 451. Theory and application of the finite element method; stiffness matrices for triangular, quadrilateral, and isoparametric elements; two- and three-dimensional elements; algorithms necessary for the assembly and solution; direct stress and plate bending problems for static, nonlinear buckling and dynamic load conditions; displacement, hybrid, and mixed models together with their origin in variational methods. *Prerequisite:* T A M 451, or CEE 379, or consent of instructor. 1 unit.

479. Earthquake Engineering
Study of the effects of earthquakes on constructed works and of the design of structures to resist earthquake motions; earthquake ground motions and mechanisms; response of structures to earthquake motion; behavior of

materials, elements, assemblages and structures subjected to earthquake motion; principles of earthquake resistant design; and special topics. *Prerequisite:* CEE 374. 1 unit.

480. Earth Pressures and Retaining Structures

Classical and modern earth pressure theories and their experimental justification; pressures and bases for design of retaining walls, bracing of open cuts, anchored bulkheads, cofferdams, tunnels, and culverts. *Prerequisite:* Credit or concurrent registration in CEE 384. 1 unit.

481. Earth Dams and Related Problems

Fundamentals of problems of slope stability; seepage in composite sections and anisotropic materials; methods of stability analysis; mechanism of failure of natural and artificial slopes; compaction; and field observations. *Prerequisite:* Credit or concurrent registration in CEE 384. 1 unit.

482. Advanced Analysis of Consolidation of Clays

Elastic solutions relevant to soil mechanics; permeability; general application of Terzaghi's theory of one-dimensional consolidation; advances in consolidation theories; mechanism of volume change; delayed and secondary compressibility and creep; theory of three-dimensional consolidation and solutions; radial flow and design of sand drains; and analysis and control of settlement. *Prerequisite:* CEE 383. 1 unit.

483. Advanced Analysis of Shear Strength of Soils

Physico-chemical properties of soils; fabric and structure of soil; mechanism of shearing resistance; residual shear strength of overconsolidated clays and clay shales; long-term shear strength of overconsolidated clays; Hvorslev shear strength parameters; and undrained shear strength of clays. *Prerequisite:* CEE 383. 1 unit.

484. Foundation Engineering

Critical study of case histories of projects in foundation engineering; current procedure for design and construction of foundations, embankments, and waterfront structures. *Prerequisite:* CEE 384. 1 unit.

485. Behavior and Design of Deep Foundations

Ultimate capacities and load-deflection of piles and drilled shafts subjected to compressive loads, tensile loads, and lateral loads; effects of duration of load, soil-structure interaction; two and three dimensional analysis of pile groups with closely spaced piles; effects of installation; inspection of deep foundations and full-scale field tests. *Prerequisite:* CEE 383, 384, or consent of instructor. 1 unit.

486. Rock Mechanics, I

Physical properties and classification of intact rock, theories of rock failure, state of stress in the earth's crust, stresses and deformations around underground openings assuming elastic, plastic, and time-dependent behavior; effect of geologic discontinuities on rock strength; and introduction to stability analyses in rock. *Prerequisite:* CEE 383; GEOL 450 or

equivalent; T A M 321 or equivalent; or consent of instructor. 1 unit.

487. Rock Mechanics, II

Application of rock mechanics to engineering problems; shear strength of rock masses; dynamic and static stability of rock slopes; deformability of rock masses; design of pressure tunnel linings and dam foundations; controlled blasting and blasting vibrations; tunnel support; machine tunneling; design and construction of large underground openings; and field instrumentation. *Prerequisite:* CEE 486 or consent of instructor. 1 unit.

495. Civil and Environmental Engineering Seminar

Discussion of current topics in civil and environmental engineering and related fields by staff, students, and visiting lecturers. 0 to ¼ unit. May be repeated.

497. Independent Study in Civil Engineering

Individual investigations or studies of any phase of civil engineering selected by the student and approved by the adviser and the staff member who will supervise the investigation. *Prerequisite:* Consent of instructor. 0 to 4 units.

498. Civil Engineering Special Topics

Structured presentations of new and developing areas of knowledge in civil engineering at an advanced graduate level. *Prerequisite:* Individually identified for each offering under this course number; see *Timetable*. ¼ to 1 unit.

499. Thesis Research

0 to 4 units.

CLASSICAL CIVILIZATION

(See Classics)

CLASSICS

Chair: David Sansone

Department Office: 4072 Foreign Language Building, 707 South Mathews Avenue, Urbana

Phone: 333-1008

URL: wsi.cso.uiuc.edu/classics

Includes Classical Civilization (CLCIV), Coptic (COP), Greek (GRK), and Latin (LAT)

Note: The following courses presuppose no knowledge of the Greek and Latin languages and are open to all students. For other courses in the area of classical civilization, see ARCH 210; ARTHI 215, 216, and 323; HIST 181, 182, 381, 382, 383, and 384; PHIL 203 and 310; POL S 393; and RELST 201, 202, and 340.

Classical Civilization (CLCIV)

100. Vocabulary Building from Greek and Latin Roots

Vocabulary building assistance for students through an analysis of Greek and Latin roots, prefixes, and suffixes found in English. 2 hours.

102. Medical Terminology from Greek and Latin Roots

Introduction to the study of the Greek and Latin roots of contemporary medical terminology and to the linguistic patterns governing their combination and usage. 3 hours.

110. Introduction to Greek Culture

Study of social and cultural life in Greece during the classical period. 2 hours. Credit is not given for both CLCIV 110 and 114.

111. Mythology of Greece and Rome

Study of the major myths of Greece and Rome and their impact upon later art, music, and literature. 2 hours. Credit is not given for both CLCIV 111 and 115.

112. The Roman Achievement

Introduction to Roman civilization through the study of the social and cultural life of ancient Rome. 2 hours. Credit is not given for both CLCIV 112 and 116.

114. Introduction to Greek Culture

Studies the social and cultural life in Greece during the classical period. Shares two hours of lecture with CLCIV 110; additional hour of lecture-discussion for a closer analysis of topics. 3 hours. Credit is not given for both CLCIV 114 and 110.

115. Mythology of Greece and Rome

Studies the major myths of Greece and Rome and their impact upon later art, music, and literature. Shares two hours of lecture with CLCIV 111; additional hour of lecture-discussion for a closer analysis of topics. 3 hours. Credit is not given for both CLCIV 115 and 111.

116. The Roman Achievement

Introduces Roman civilization through the study of the social and cultural life of ancient Rome. Shares two hours of lecture with CLCIV 112; additional hour of lecture-discussion for a closer analysis of topics. 3 hours. Credit is not given for both CLCIV 116 and 112.

120. Origins of Western Literature

Same as C LIT 120. Origins and development of selected major genres in Western literature, emphasizing the relationship between classical representatives and their modern successors. 3 hours.

131. Introduction to Classical Archaeology: Greece

Introduction to the archaeology of ancient Greece and the Aegean world. 3 hours.

132. Introduction to Classical Archaeology: Rome and Italy

Introduction to the archaeology of Italy and Rome to the fall of the Roman Empire. 3 hours.

150. Sports in Greece and Rome

Same as KINES 141. Athletics and sports in ancient Greece and Rome from 776 B.C. to 393 A.D. 2 hours.

160. Ancient Greek and Roman Religion

Same as RELST 160. Study of Greek and Roman Paganism and the rise of Christianity within that context. Readings are confined to ancient sources in English translation. 3 hours.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

217. Greek Art

Same as ARTHI 215. See ARTHI 215.

218. Roman Art

Same as ARTHI 216. See ARTHI 216.

221. The Heroic Tradition

Same as C LIT 263. Study of ancient epics and their relation to the social consciousness of their period; introductory and background lectures; and readings in the epic tradition of antiquity and its successors. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

222. The Tragic Spirit

Same as C LIT 264. Readings in the tragic drama of Greece and Rome; a systematic study of the contents and development of this classical literary/dramatic genre. *Prerequisite:* Sophomore standing or consent of instructor; completion of campus Composition I general education requirement (applies to writing-intensive sections taken for Composition II credit.). 3 hours.

231. The Development of the Ancient City

Same as ARTHI 217. Monuments and archaeological remains illustrating the development of the Greek and Roman city (polis). *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

232. Ancient Greek Sanctuaries

Same as ARTHI 218 and RELST 232. Survey of the archaeological remains of ancient Greek sanctuaries and their importance to ancient society and religion. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

240. Sex and Gender in Classical Antiquity

Same as C LIT 262 and W S 240. Understanding of the place of women in ancient societies can be gained through the examination of the ways in which the ancients conceptualized sex and gender. The myths, religion, art and literature of Egypt, Greece, Rome and the Near East contain a wide array of representations of men and women, of their emotions, as well as of their social, legal and political status and relations. 3 hours.

292. Senior Thesis

Thesis and honors; for candidates for departmental distinction in classical civilization and for other seniors. *Prerequisite:* Senior standing and consent of Classics Honors Program. 2 to 4 hours. (Counts for advanced hours in L.A.S.)

298. Senior Survey

For candidates for departmental distinction in the classics major. *Prerequisite:* Senior standing, and consent of Classics Honors Program. 2 to 4 hours. (Counts for advanced hours in L.A.S.)

315. Greek, Roman, and Medieval Rhetorical Theory

Same as SPCOM 315. See SPCOM 315.

318. Etruscan and Italic Art

Same as ARTHI 318. See ARTHI 318.

343. The Archaeology of Greece

Same as ARTHI 315. Monuments, material remains, and sculpture and other arts illustrating the development of GRK civilization to 323 B.C. *Prerequisite:* A course in ancient history, art, or language, or consent of instructor. 3 hours or ¾ unit.

344. The Archaeology of Italy

Same as ARTHI 316. Monuments, material remains, and sculpture and other arts illustrating the development of Graeco-Roman and other ancient Italian civilizations to 330 A.D. *Prerequisite:* A course in ancient history, art or language, or consent of instructor. 3 hours or ¾ unit.

345. Field Work in Classical Archaeology

Participation in archaeological excavation: methods of stratigraphic excavation and material analysis are discussed and practiced in actual working conditions. Will be offered during spring, summer or fall semesters, as faculty activities allow. *Prerequisite:* Consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated to a maximum of 12 hours or 3 units.

382. Computer-Based Foreign Language Teaching

Same as E I L, FR, GER, HUMAN, ITAL, PORT, SLAV, and SPAN 382, and LING 386. See HUMAN 382.

390. Topics in Classical Literature

Same as C LIT 307. Study of selected topics in Greek and Latin literature in translation; content is variable. *Prerequisite:* A 200 level classical civilization course, or consent of instructor. 3 hours, or ¾ or 1 unit. May be repeated.

391. Topics in Classical Archaeology and Civilization: Seminar and Tutorial

Study of selected topics; variable content. *Prerequisite:* Consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated.

415. Seminar in Ancient Art

Same as ARTHI 415. See ARTHI 415.

420. Seminar in Classical Archaeology

Same as ARTHI 420. Problems in classical archaeology. Various topics in all fields of classical archaeology such as ancient topography, agricultural practices, ancient industries and crafts, and trade patterns as documented by

pottery, will be offered in separate semesters. *Prerequisite:* Graduate standing in Classical Civilization, Art History, Anthropology, Architecture, or History, or consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

Coptic (COP)**301. Introductory Coptic, I**

Same as LING 314 and RELST 301. Introduction to the principles of Coptic grammar and to the reading of biblical and gnostic texts. 3 hours or ¾ unit. A knowledge of classical or koine Greek, though useful, is not required.

302. Introductory Coptic, II

Same as LING 315 and RELST 302. Continuation of COP 301; reading of gnostic and postbiblical texts. *Prerequisite:* COP 301. 3 hours or ¾ unit.

Greek (GRK)**101. Elementary Greek, I**

Same as RELST 111. Introduces ancient Greek (both classical and koine), including the reading of simple prose. 4 hours.

102. Elementary Greek, II

Same as RELST 112. Continuation of GRK 101. Grammar and reading in classical and koine Greek. *Prerequisite:* GRK 101. 4 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Classical and Koine Greek Prose

Same as RELST 200. Readings in classical Greek prose, and narrative and epistolary New Testament texts. *Prerequisite:* GRK 102. 4 hours.

202. Classical and Koine Greek Prose, II

Same as RELST 204. Continuation of GRK 201. Further readings in classical Greek prose, and narrative and epistolary New Testament texts. *Prerequisite:* GRK 201 or equivalent. 4 hours.

292. Senior Thesis

Thesis and honors. Open to candidates for distinction in Greek. *Prerequisite:* Senior standing, and consent of Classics Honors Program. 2 to 4 hours. (Counts for advanced hours in L.A.S.)

298. Senior Survey

For candidates for distinction in Greek and for other seniors. *Prerequisite:* Senior standing, and consent of Classics Honors Program. 2 or 4 hours. (Counts for advanced hours in L.A.S.)

301. Homeric Greek

Introduction to Epic Greek; readings of Homer. *Prerequisite:* GRK 202 or equivalent. 3 hours or ½ unit.

310. Introduction to Indo-European Linguistics

Same as LAT 310 and LING 309. See LING 309.

311. Greek Prose Composition

Practice in the writing of Greek prose. *Prerequisite:* GRK 201 or equivalent. 3 hours or ½ unit.

391. Readings in Greek Literature

Readings in authors or special topics chosen by the instructor from the entire extant literature in Greek. *Prerequisite:* GRK 301 or equivalent. 3 hours, or ¾ or 1 unit. May be repeated.

393. Independent Reading

Prerequisite: GRK 301 and consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated (to a maximum of 8 hours or 3 units).

411. Advanced Composition

Practice in writing continuous Greek prose, with special attention to stylistic problems. *Prerequisite:* GRK 311 or equivalent. ½ unit.

420. Proseminar

Alternating poetry and prose, concentrates on a major author from one of the following areas: epic, history, lyric poetry, oratory, drama, or philosophy. Areas normally follow this sequence in successive years. *Prerequisite:* GRK 391 or equivalent. 1 unit. May be repeated as topics vary, to a total of 5 units.

431. Special Disciplines

Same as LAT 431. Variable content course concentrating on an area such as comparative grammar, epigraphy, metrics, palaeography, or papyrology. *Prerequisite:* GRK 391 and LAT 391, or equivalent. 1 unit. May be repeated as topics vary.

480. Greek Seminar

Research on special problems of Greek literature; required of all majors in classical philology. *Prerequisite:* A Greek proseminar. 1 unit.

495. Introduction to Classical Studies

Same as LAT 495. Introductory survey for graduate students in classics; prepares students for work at the graduate level and surveys basic bibliography and methodology. *Prerequisite:* Graduate standing in classics. 1 unit.

499. Thesis Research

Guidance in writing theses for advanced degrees. 0 to 4 units.

Latin (LAT)**101. Elementary Latin**

Grammar and reading for students who have had no work in Latin. 4 hours.

102. Elementary Latin

Grammar and reading of easy prose. *Prerequisite:* LAT 101 or one year of high school Latin. 4 hours.

103. Intermediate Latin

Review of grammar; reading of easy narrative prose. *Prerequisite:* LAT 102 or two years of high school Latin. 4 hours.

104. Introduction to Latin Literature

Continuation of LAT 103, with readings chiefly in Latin poetic literature. 4 hours.

105. Intensive Elementary Latin

Equivalent to LAT 101 and 102. Introduction to basic grammar and syntax for students who have had no previous Latin and want to learn

at a rapid rate; use of computer-assisted individual mastery lessons. 8 hours.

106. Intensive Intermediate Latin

Equivalent to LAT 103 and 104. Review of grammar and syntax and reading of easy prose and poetry for students who have attained 102 proficiency and wish to advance more rapidly; use of computer-assisted program materials. *Prerequisite:* LAT 102 or 105, or a placement score showing high school achievement equivalent to LAT 102. 8 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Survey of Latin Literature

The republican period. *Prerequisite:* LAT 104 or four years of high school Latin. 3 hours. (Counts for advanced hours in L.A.S.)

202. Survey of Latin Literature

The imperial period. *Prerequisite:* LAT 104 or four years of high school Latin. 3 hours. (Counts for advanced hours in L.A.S.)

271. Introduction to Second Language Learning and Teaching

Same as FR, GER, HUMAN, RUSS, and SPAN 271. See SPAN 271.

275. Developing and Implementing Communicative Language Teaching

Same as FR, GER, RUSS, and SPAN 275. See SPAN 275.

278. Current Issues in Secondary Language Teaching

Same as FR, GER, RUSS, and SPAN 278. See SPAN 278.

292. Senior Thesis

Thesis and honors. For candidates for honors in Latin and for other seniors. *Prerequisite:* Senior standing, and consent of Classics Honors Program. 2 or 4 hours. (Counts for advanced hours in L.A.S.)

298. Senior Survey

For candidates for honors in Latin and for other seniors. *Prerequisite:* Senior standing and consent of Classics Honors Program. 2 or 4 hours. (Counts for advanced hours in L.A.S.)

310. Introduction to Indo-European Linguistics

Same as GRK 310 and LING 309. See LING 309.

311. Intermediate Prose Composition

Practice in the writing of Latin prose. *Prerequisite:* Credit or concurrent registration in LAT 201 or the equivalent. 3 hours or ½ unit.

360. Medieval Latin

Literary and historical texts in prose and poetry will be read in the original; the course will also cover patristic writings. *Prerequisite:* Two years of college Latin, or consent of the instructor. 3 hours or ¾ unit.

391. Readings in Latin Literature

Readings in authors or special topics chosen by the instructor from the entire extant literature in Latin. *Prerequisite:* Three years of college Latin or equivalent; consent of

instructor. 3 hours, or ¾ or 1 unit. May be repeated for credit.

393. Independent Reading

Prerequisite: LAT 202 and consent of the instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated to a maximum of 8 hours or 3 units.

400. Beginning Latin for Graduate Students

Basic grammar, syntax, and vocabulary; reading practice. Designed for graduate students who need to use Latin in their research. 4 hours. No graduate credit.

401. Readings in Latin for Graduate Students

Directed readings, largely in medieval and modern Latin. Designed for graduate students who need to use Latin in their research. *Prerequisite:* LAT 400 or two years of high school Latin, or equivalent. 4 hours. No graduate credit.

411. Advanced Composition

Practice in writing Latin prose, with special attention to stylistic questions. *Prerequisite:* LAT 311 or equivalent. ½ unit.

420. Proseminar

Alternating poetry and prose, concentrates on a major author from one of the following areas: epic, oratory, lyric and elegiac poetry, history, drama, philosophy, satire, or epistolography. Areas normally follow this sequence in successive years. *Prerequisite:* LAT 391 or equivalent. 1 unit. May be repeated as topics vary to a maximum of 5 units.

431. Special Disciplines

Same as GRK 431. See GRK 431.

480. Latin Seminar

Research on special problems of Latin literature; required of all majors in classical philology. *Prerequisite:* A Latin proseminar. 1 unit.

495. Introduction to Classical Studies

Same as GRK 495. See GRK 495.

499. Thesis Research

Guidance in writing theses for advanced degrees. 0 to 4 units.

COMMUNICATIONS

Chairperson of Committee on Graduate Study:

Clifford Christians

Office: 222B Armory, 505 East Armory Avenue, Champaign

Phone: 333-1549

URL: www.comm.uiuc.edu/icr/home

Communications (COMM)

101. The Social and Cultural Foundations of the Mass Media

Analysis of the evolution and structure of the mass media in the United States with special emphasis on the effects of the mass media on public life. *Prerequisite:* Freshman or sophomore standing. 3 hours. Does not count toward major requirements in the College of Communications.

166. Media Literacy

Develops students' ability and skills to analyze, assess, and critically evaluate media images, words, sounds, and presentations that comprise mass culture, and to understand the media's roles in the contemporary world. As part of their learning in the course, students prepare their own media, use logs and evaluate their exposure to media and advertising. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Information, Technology and Organizations

Same as LIS 201. See LIS 201.

202. Social Aspects of Information Systems

Same as LIS 202. See LIS 202.

217. History of Communications

Same as JOURN 217. Nature and development of communication systems; history of communication media; history of journalism, advertising, and broadcasting; and communications in the modern world. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

218. Communications and Public Opinion

Same as JOURN 218. See JOURN 218.

220. Communications and Popular Culture

Same as JOURN 220. Examines the critical literature on mass media entertainment; reviews significant contemporary issues and develops perspectives for understanding popular culture. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

221. Film Culture: Interpretation and Theories

Introduces students to key issues of, major theoretical approaches to, and current debates about the cultural function of films. Course addresses theories of spectatorship, the politics of pleasure, the culture of entertainment, and the cinematic construction of race, class and gender. 3 hours.

231. Mass Communication in a Democratic Society

Same as JOURN 231. Studies the philosophical bases of the functions and the responsibilities of mass communications. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

241. Law and Communications

Same as JOURN 241. See JOURN 241.

251. Social Aspects of Mass Communications

Same as JOURN and SOC 251. Media structures related to cultural content and functions; problems of life and society as treated in mass-produced communications. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

256. Women in Popular Film and Television

Same as W S 286. Course begins by examining the notion that the mass media might influence our development as gendered individuals, looking at those who have argued both for and against this notion. It then considers briefly the different forms of feminist theory which exist, and how they have been applied to the study of the mass media. These introductory weeks are followed by an examination of the development of images of women in film and television, and an examination of how these images might function for different segments of the female audience. The course also looks at the history of these media, the history of their portrayal of women, feminist criticisms of these portrayals, feminist discussions of the appeal of specifically "female" genres such as melodramas and soap operas to the female audience, feminist attempts to create alternatives to mainstream images in various media, and the representation of women of color in the dominant media. 3 hours.

261. American Broadcasting and Telecommunications

Examines the history and principal issues of American broadcasting and the electronic media; the context of prior forms of mass communication and ideas about purposes and terms of control; the important social, economic, political, and cultural questions bearing on AM and FM radio, commercial television, public broadcasting, cable and new forms of electronic communication; issues in programming and service content; and basic legal and regulatory matters. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

264. Economic Structure of Communication

Describes and analyzes the economic structures, policies, and current problems of fields such as telecommunications, publishing, broadcasting and cable, film, recorded music, and postal service; examines how copyrights, patents, antitrust laws, and government regulation bear on the communications industry. *Prerequisite:* Consent of college. 3 hours.

275. History and Development of Latina/Latino Media in the United States

Same as LLS 275. Examines the portrayal and participation of Latinas and Latinos in the U. S. media using a variety of interdisciplinary approaches. Addresses historical and political movements that have been critical to Latina/Latino print, broadcast, and electronic communication within the broader context of cultural diversity. 3 hours.

277. Global Communications

Introduces students to the multiple dimensions of cross-national and comparative com-

munications. Specific topics will vary according to instructor's focus, but may include human dimensions of global communication, intercultural communication, media impact, structure and processes of institutional communication (i.e. propaganda, diplomacy). *Prerequisite:* Registration in the College of Communications or consent of the College. 3 hours.

291. Special Problems

Special projects, research, and independent reading in communications for students capable of individual work under the guidance of a faculty adviser. *Prerequisite:* Consent of college. 1 to 3 hours.

295. Honors Research Seminar in Media Studies

An honors research seminar open to qualified Media Studies' majors, and to other advanced students in the College of Communications. The seminar has two primary goals: (a) to introduce students to alternative research approaches used in the scholarly study of mass communication; and (b) to enable students to employ one or more of these methodological approaches in producing an independent research project on a topic of their own choosing. The seminar meets as a group only for the first several weeks of the semester, to discuss different research methodologies used in mass communication research and to present topics to the class; and for the last two weeks of the term, to present completed projects to the larger group. Otherwise students meet regularly with instructor (and any other advisers they may have chosen from among the media studies faculty) to discuss and provide evidence of progress of their independent research papers. *Prerequisite:* At least 2 courses in Media Studies. 2 hours.

308. Cultural Analysis of Screen Media

Same as SPCOM 308. See SPCOM 308.

310. Media Ethics

Surveys the major ethical problems in news, publications advertising, publications and entertainment media; includes case studies and moral reasoning on confidentiality, privacy, conflict of interests, deception, violence, and pornography. *Prerequisite:* Consent of college or consent of instructor. 3 hours or 1 unit.

319. Studies in Russian and East European Cinema

Same as CINE, SLAV, and SPCOM 319. See SLAV 319.

322. Politics and the Media

Same as POL S 322 and SPCOM 325. See SPCOM 325.

323. Language Acquisition

Same as LING and PSYCH 323. See PSYCH 323.

325. Introduction to Psycholinguistics

Same as LING 325. See LING 325.

335. Interpersonal Communication Processes

Same as SPCOM 335. See SPCOM 335.

352. Attitude Theory and Change

Same as PSYCH and SOC 352. See PSYCH 352.

362. Telecommunications Management

Examines problems and issues in telecommunications management; the role of management in operation of broadcasting, cable, and telecommunications industries; forces shaping products and services in commercial and nonprofit media, i. e., technology, markets, revenues, programming, and regulation; planning, accountability, and social responsibility. *Prerequisite:* Consent of college or consent of instructor. 3 hours or 1 unit.

366. Film as Business

Studies the filmed entertainment industry; the economic structures and policies of the production, distribution, and exhibition sectors; the nature of ownership patterns, investment, competition, and trade practices; filmed entertainment as a commodity in an international market system. *Prerequisite:* Consent of college or consent of instructor. 3 hours or 1 unit.

368. Legal and Policy Issues in Telecommunications

Studies the histories, assumptions, and consequences of major legislative, regulatory, and judicial decisions in American broadcasting and telecommunications; social, cultural and economic background of federal communications law and regulation; administrative agency (FCC) practice and constraints; various regulatory and policy issues including fiduciary licensing, fairness doctrine, cable, public broadcasting, telematics, deregulation, and statutory revision process. *Prerequisite:* Registration in College of Communications or consent of the college. 3 hours or 1 unit.

370. Language, Culture, and Society

Same as ANTH and LING 370. See ANTH 370.

377. International Communications

Same as POL S 377. See POL S 377.

391. Literacy in the Information Age

Same as LIS 391. See LIS 391.

410. Communication in International Development

Same as AGCOM 410. See AGCOM 410.

414. Seminar on Social Interaction

Same as SOC 414. See SOC 414.

420. Seminar in Semantics

Same as PHIL 420. See PHIL 420.

424. Developmental Psycholinguistics

Same as LING and PSYCH 424. See PSYCH 424.

425. Psycholinguistics

Same as LING and PSYCH 425. See PSYCH 425.

432. History of Libraries

Same as LIS 432. See LIS 432.

437. The Analysis of Interpersonal Interaction

Same as SPCOM 437. See SPCOM 437.

460. Feminist Media Studies: Feminist Theory, the Media, and the Politics of the Popular

Same as W S 460. Course addresses major areas of theoretical debate or interest in the broad topic of "Feminist Media Studies" and looks in depth at a number of theoretical issues which define it. Development of an understanding of historical, psychoanalytic, interpretive, and social scientific approaches to the study of film and television texts, their reception, and their production is expected. Readings are extensive and directed toward illustrating the range of theoretical and empirical approaches applied to addressing questions of central interest in the field. Viewings will emphasize some lesser-known historical texts central to theoretical debates in the field. Viewings and readings are focused on "popular" film and television. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

463. World Broadcasting

Studies the broadcast systems used by the nations of the world; alternative and mixed systems; international organizations, agreements, exchanges, and problems; broadcasts to and from other countries; implications of such new developments as satellites; and mass and nonmass uses. *Prerequisite:* Consent of department. 1 unit.

468. The Political Economy of Communications

Same as JOURN 468. Analyzes the structure, policy, and behavior of such media of communication as newspapers, magazines, books, postal service, telegraph, telephone, broadcasting, and film; special emphasis on their relationships to political order and the economy. *Prerequisite:* Consent of College of Communications. 1 unit.

470. Communications and Popular Culture

Same as JOURN 470. Problems of cultural analysis related to the media of communications; social implications of communications research. *Prerequisite:* Consent of College of Communications. 1 unit.

471. Proseminar in Communications, I

Same as JOURN 471. General discussion of the mass media of communications, their role as social institutions, and their control and support; content, audience, and effect of the mass media. *Prerequisite:* Consent of College of Communications. 1 unit.

472. Proseminar in Communications, II

Same as JOURN 472. General discussion of the problem of communications, including the individual as a communicating system, symbolic processes, analysis of messages, psycholinguistics, and language as social behavior. *Prerequisite:* Consent of College of Communications. 1 unit.

473. History and Theory of Freedom of the Press

Same as JOURN 473. Development of the Anglo-American press system and the idea of freedom of the press; contemporary mass media and their implications for freedom and democracy. *Prerequisite:* Consent of College of Communications. 1 unit.

474. Communications Systems

Same as JOURN 474. Analyzes the structure and development of communications systems; examination of the role of communication in social change, political movements, and formal organizations. *Prerequisite:* Consent of College of Communications. 1 unit.

477. Philosophy of Technology

Course introduces students to those thinkers who understand technology philosophically as a central component in modern culture. The major perspectives on the nature of technology are rooted in Norbert Weiner, Karl Marx, and Martin Heidegger. Media technologies, information systems, and global communications share background problems and basic issues with technology generally. Instrumentalism, feminist and critical approaches, ethical concerns, alternative technologies are developed in the context of technology as a cultural activity. 1 unit.

482. Research Methods in Advertising and Communications

Same as ADV 482. See ADV 482.

485. Advertising Planning and Decision Making

Same as ADV 485. See ADV 485.

490. Special Topics in Communications

Prerequisite: Consent of chairperson of committee on graduate study in communications. ½ to 2 units.

492. Research Methods in Communications

Same as JOURN 492. Introduction to the methods of empirical research in the behavioral sciences applicable to research problems in human communication, with emphasis on studies of mass communication. Lectures, readings, and laboratory practice. *Prerequisite:* Consent of College of Communications. 1 unit.

493. Qualitative Research Methods in Communications

Introduces qualitative concepts and strategies in the social sciences and humanities which apply to research problems in mass communications. *Prerequisite:* Consent of College of Communications. 1 unit.

499. Thesis Research

Prerequisite: Consent of chairperson of committee on graduate study in communications, and of thesis supervisor. 0 to 4 units. May be repeated to a maximum of 8 units.

COMMUNITY HEALTH

Interim Head of Department: Thomas O'Rourke
 Department Office: 121 Huff Hall, 1206 South Fourth Street, Champaign
 Phone: 333-3163
 URL: www.als.uiuc.edu/chlth

Includes Community Health (CHLTH) and Rehabilitation Counseling (REHAB)

Community Health (CHLTH)

100. Contemporary Health

Examines concepts of health and health promotion in contemporary society with emphasis on health and injury control for individuals and groups. Topics include self care, health insurance, exercise, nutrition and weight control, sexuality, contraception, tobacco, alcohol, cardiovascular health, infectious diseases, and cancer. 3 hours.

101. Introduction to Public Health

Introduction to the nation's public health system; includes an overview of historical roots and organizational structure, basic research tools, concepts and scope of varied public health programs, topical treatment of major contemporary health and safety problems. 3 hours.

111. Professional Seminar

Orientation to department; current views and issues in health fields; career opportunities, and other related topics. 0 credit.

140. Health Advocate, I

Provides an overview of current college student health issues and concerns, knowledge of the University of Illinois health care delivery system and an understanding of medical self care; develops skills in communication and referral techniques enabling students to be advocates for members of their living units. 2 hours.

141. Health Advocate, II

Provides the opportunity to utilize knowledge of college health issues and concerns, and communication skills in coordinating health promotion programming for members of their living units. *Prerequisite:* CHLTH 140. 1 hour. May be repeated to maximum of 3 hours.

143. Drug Use and Abuse

Introduction to the biological, psychological, pharmacological, and legal aspects of drug use and abuse; surveys community and university resources concerned with drug use and abuse; emphasizes personal and social actions for responsible drug use. 2 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Mental Health

Introduction to the science of mental health and illness including personality development, the genesis and manifestations of mental illness, and the maintenance of mental health; taught by a psychiatrist with emphasis on the preventive and medical aspects of mental health. 2 hours.

204. Foundations of Health Behavior

Examination of the application of the social and behavioral sciences to health and health behavior. Psychological, social psychological, and sociological approaches to health behavior will be analyzed. Topics that will be covered include the development of health attitudes and behaviors, perceptions of health and illness, methods of changing health behavior and patient-provider interaction. *Prerequisite:* CHLTH 100, or consent of instructor; completion of the campus Composition I requirement. 4 hours.

tion of the campus Composition I requirement. 4 hours.

206. Human Sexuality

Emphasizes the behavioral aspects of human sexuality. Topics include: birth control; prenatal care, pregnancy and childbirth; sex roles; premarital sex; lifestyles; marriage and divorce. 2 hours.

210. Community Health Organizations

Overview of institutions and agencies which provide health information, education, services, and care. Includes historical foundations, constituencies, organizational goals and structure, funding and expenditures, modes of service delivery, political and ethical issues. *Prerequisite:* CHLTH 100 and 101. 2 hours.

214. Introduction to Aging

Same as HDFS, LEIST, PSYCH, and REHAB 214. See HDFS 214.

240. Health Promotion Practicum

Preparation and presentation of lifestyle workshops to campus community groups. Practice selected from one or more of the following topics: chemical education, sexuality, stress management or campus acquaintance rape education (CARE). *Prerequisite:* Junior standing, or consent of instructor. 3 hours. May be repeated once for credit.

250. Health Care Systems

Overview of the major issues confronting health care systems from a macro perspective. Identification and analysis of the functions, major participants and trends in health care systems in the United States and abroad. Attention is directed at current and emerging issues having implications for health care systems in industrialized nations. 3 hours.

266. Tomorrow's Environment

Same as CPSC and ENVST 236. See CPSC 236.

274. Introduction to Epidemiology

Basic concepts and methods of epidemiology; patterns of disease occurrence; applications of epidemiology to health education, health services administration and planning, health policy, and environmental health. *Prerequisite:* CHLTH 100 and 101, or consent of instructor. 3 hours.

280. Orientation to Internship

Provides students with information concerning placement in internship. Topics include internship requirements; student responsibilities; preparation of resumes and cover letters; selecting an organization or site; interviewing; issues of professional development. *Prerequisite:* Junior standing. 0 credit.

285. Community Health Internship

Supervised field experience in official, voluntary and professional health agencies; designed to provide students in Community Health with work experience in actual field situations. Students work for 12 weeks in University-approved health agencies for a minimum of 480 hours. *Prerequisite:* Completion of CHLTH 300-level courses in field of concentration; Senior standing in Community Health and consent of instructor. 8 hours.

290. Honors Seminar

Same as KINES 290 and LEIST 260. See KINES 290.

293. Special Projects

Special projects in research and independent investigation in any phase of health, kinesiology, recreation, and related areas selected by the students. *Prerequisite:* Junior or senior standing; grade-point average of 2.5; consent of faculty adviser and instructor, and approval of the head of department. 2 or 3 hours. May be repeated for a total of 4 or 6 hours.

309. Women's Health

Same as W S 335. Examines the culture of women in relationship to their health. Study will be devoted to selected health care issues, developmental and physiological changes in the life cycle, health problems that affect women, and the maintenance of health. *Prerequisite:* CHLTH 100 or equivalent; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

310. Public Health Practice

Theory and practice of public health promotion as they relate to educational approaches in solving community health problems. *Prerequisite:* CHLTH 210, or consent of instructor. 4 hours or 1 unit.

321. Health Data Analysis

Introduces health data analysis, sources and uses of health data, collection techniques and classification procedures, commonly used health indices, techniques of rate adjustment, graphic presentation of data as they relate to the planning, conducting, and evaluating of community health programs. *Prerequisite:* CHLTH 391, or SOC 385, or EDPSY 290, or equivalent. 3 hours or 1 unit.

329. Research Techniques for the Health Sciences

Study of the ethics of research, research literature, research designs, and health measurement techniques utilized in the public health sciences. Emphasizes developing skills in analyzing research and assessment of health behaviors, and problem identification and research design for individual student research projects. *Prerequisite:* CHLTH 391, or SOC 385, or EDPSY 390; or equivalent. 4 hours or 1 unit.

348. Exercise and Health Psychology

Same as KINES 348. See KINES 348.

355. Health Services Financing

Examines major topics and emerging trends in health financing, including sources of revenue, public and private financing organizations, reimbursement and sources of revenue to health providers, and capital financing in the health care industry. *Prerequisite:* Junior standing. 3 hours or $\frac{3}{4}$ unit.

356. The Organization of Health Care

Same as SOC 339. Examines types and performance of health care organizations (e.g., doctors' offices, clinics, hospitals, and nursing homes), networks of health services, evaluation of health care, and social policy issues relating to organizations in the U. S. health care system. *Prerequisite:* Six hours of anthropology, sociology, community health, or psychology. 3 hours, or $\frac{1}{2}$ or 1 unit.

357. Health Planning

Same as SOC W 357. Survey of the history and objectives of health planning as related to medical care delivery in the United States; methods of health, institutional and community planning; planning and marketing concepts and methods; analysis of consumer behavior, public policies, and private competitive forces. *Prerequisite:* CHLTH 250 and junior standing. 3 hours or $\frac{3}{4}$ unit.

358. Health Administration

Examines management principles relative to health care institutions; emphasizing goal setting, decision making, system analysis, organizational structure, conflict resolution, and leadership theories. *Prerequisite:* Senior or graduate standing, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

361. Toxic Substances in the Environment

Same as ENVST 331. See ENVST 331.

369. Environmental Health

Same as ENVST 369. Appreciation of the concepts and mechanisms used to reduce or prevent environmental problems that may lead to infectious or environmentally-induced diseases; presents topics from a public health perspective which include water supply management, waste water treatment and disposal, radiation protection, pest control, and solid waste management. *Prerequisite:* CHLTH 274 or equivalent. 2 hours or $\frac{1}{2}$ unit.

371. Epidemiology and the Media

Same as VP 371. See VP 371.

374. Principles of Epidemiology

Same as ENVST, MED S and VP 374. The epidemiology and natural history of infectious and noninfectious diseases, including integrated vector control and host resistance; mental health and public health. *Prerequisite:* MCBIO 326, VP 332, or equivalent; or consent of instructor. 4 hours or 1 unit.

375. Geographical Epidemiology

Same as GEOG 372. Patterns of health and disease in place and time; time-space analysis and mapping; interrelations between health and population, behavior, and environment; sociocultural aspects; investigative examples from mid-latitude continental, oceanic, and tropical settings. *Prerequisite:* CHLTH 374, or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

385. Community Health Advanced Internship

Observation, study, and practical work in student's area of specialization under supervision in professional field situations; student works for a minimum of 12 weeks in a University-approved agency or site. *Prerequisite:* CHLTH 329, 374 and 410; or graduate standing in community health; or consent of the department. 4 hours or 1 unit.

391. Biostatistics

Same as VP 391. See VP 391.

394. Special Topics

Lecture-discussion course in topics of current interest; see *Timetable* for specific subjects. *Prerequisite:* Consent of instructor. 2 to 4 hours,

or $\frac{1}{2}$ to 1 unit. May be repeated to a maximum of 8 hours or 2 units.

401. Issues in Health Education

Analyzes current developments, trends, and controversies in health education with emphasis on developing student competencies for intervention planning, implementation and analyses; and examines issues affecting the health educator in various work settings, including patient care, public health, school health, and higher education. 1 unit.

410. Public Health Development

Advanced study of the principles, practice and current issues of public health at the local, state, national and international levels, including the relationships between public health departments, voluntary health agencies, and other community organizations. 1 unit.

427. Statistical Techniques in Epidemiological Research

Same as ENVST 427, MED S 463, and VP 426. Description and application of quantitative issues and statistical techniques prominent in the analysis of classification data arising from epidemiologic cohort or case-control aetiological studies; studies of preventive public health; and therapeutic clinical interventions. Confounding factors and methods of adjustment including standardization, stratified and matched analyses, and multiple logistic regression modeling are emphasized. Practice using available computing software for implementation is stressed. *Prerequisite:* CHLTH 374 and minimum of two statistics courses covering multiple regression and correlation. 1 unit.

440. Health Behavior: Theoretical Perspectives

Analysis of social science theories and perspectives that comprise the foundation of health education theory and practice. Includes development of a conceptual frame of reference for understanding, predicting, and facilitating change in health behaviors. *Prerequisite:* Graduate standing. 1 unit.

450. Health Policy in the United States

Comprehensive analysis of the policy process in health care in the United States; systematic and critical review of health policy development, implementation, and evaluation; impact of government at all levels and the role of providers, industry, labor, and consumer in health policy. *Prerequisite:* Admission to graduate program in community health or the MBA Administration Program; CHLTH 329; or consent of instructor. 1 unit.

476. Epidemiology of Infectious Diseases

Same as VP 416. See VP 416.

477. Principles and Methods of Veterinary Epidemiology

Same as VP 417. See VP 417.

478. Applied Epidemiology

Same as VP 420. Advanced epidemiologic analysis of disease problems. Covers research designs including cohort, case-control, and intervention trials; methods of analysis including multivariate adjustment for confounding and description of effect modification; and application of statistical computer software

with emphasis on chronic diseases. *Prerequisite:* CHLTH 374, VP 417, or equivalent and advanced course work in statistics through multivariate analysis. 1 unit.

479. Seminar in Epidemiology

Discussion of advanced topics in epidemiologic methods and research. Prepares students for thesis or dissertation research through study of selected literature and the completion of a research paper. *Prerequisite:* CHLTH 374 or equivalent. 1 unit.

490. Seminar for Advanced Students

Critical evaluation of theories and research studies in community health, emphasizing research methods and experimental design and analysis; and student presentations of thesis literature reviews and research procedures. *Prerequisite:* Master's thesis. $\frac{1}{2}$ unit. May be repeated to a maximum of 1 unit.

493. Special Projects

Independent research on special projects. *Prerequisite:* EDPSY 390, KINES 495, and CHLTH 440 or equivalent. $\frac{1}{2}$ to 2 units. May be repeated to a maximum of 2 units.

494. Special Topics in Community Health

Lectures on topics of current interest. $\frac{1}{2}$ or 1 unit.

499. Thesis Research

Preparation of theses in community health. 0 to 4 units.

Rehabilitation Counseling (REHAB)**199. Undergraduate Open Seminar**

1 to 4 hours. May be repeated.

206. Working With Persons with Disabilities, I

Introduction to identifying the individual needs of persons with disabilities, recognizing the variance of disabilities, and administering activities of daily living. *Prerequisite:* BIOL 120 or PHYS 103, or consent of instructor. 3 hours.

207. Working With Persons with Disabilities, II

Experience in identifying the individual needs of persons with disabilities, recognizing the variance of disabilities, and administering the activities of daily living; a continuation of REHAB 206, augmented by a paper. *Prerequisite:* REHAB 206 or consent of instructor. 3 hours.

214. Introduction to Aging

Same as CHLTH, HDFS, LEIST, and PSYCH 214. See HDFS 214.

301. Introduction to Rehabilitation

Orientation to general field of rehabilitation; includes foundations, resources, assessment, counseling, and placement. 4 hours, or 1 unit.

302. Medical Aspects of Disabilities

Examination of the scope of physical, mental and cognitive disabilities, their causes, complications, and treatment. *Prerequisite:* BIOL 122 and CSB 234; or consent of instructor. 4 hours or 1 unit.

303. Independent Living

Focuses on the concept of independent living, its medical aspects, and application to elimination of physical and social barriers to persons with disabilities. *Prerequisite:* REHAB 301 or consent of instructor. 2 hours or ½ unit.

304. Gerontology

Same as HDFS 304. See HDFS 304.

307. Social and Cultural Contexts of Disability

Examines the social and cultural contexts of disabilities, their consequences for the experience of disability, and implications for the development of habilitation and rehabilitation practice. *Prerequisite:* Six hours of social or health science, or consent of instructor. 2 hours or ½ unit.

322. Introduction to Mental Retardation

Same as PSYCH, SOC W, and SP ED 322. See SP ED 322.

335. Job Placement Techniques

Examines theories of job placement, job seeking skills, and techniques for outreach with employees. Focuses on a systems approach to job placement for persons with disabilities. Topics include supported employment, labor market trends, and job restructuring. Lab time with disabled clients who are active in the job search process is required. 2 hours or ½ unit.

340. Introduction to Sensory Impairments

Introduces sensory impairments (i.e., vision, hearing, and learning disabilities) from a rehabilitation perspective. *Prerequisite:* BIOL 122 or equivalent; PSYCH 100 or equivalent; REHAB 301. 4 hours, or 1 unit.

344. Introduction to Adaptive Technologies for Persons with Disabilities

Introduction and orientation to available adaptive technologies, their applications to various disability groups, and current research and field testing. *Prerequisite:* REHAB 301; REHAB 302, or consent of instructor. 4 hours, or 1 unit.

345. Transition Planning and Vocational Training for Individuals with Disabilities

Same SP ED and HRE 345. See SP ED 345.

381. Rehabilitation Practicum

Practical experience in a major area of rehabilitation; discussion/laboratory sections cover such practicum topics related to administration, counseling, or supported employment and other rehabilitation services. *Prerequisite:* REHAB 301 and consent of instructor. 1 unit.

401. Research Methods in Rehabilitation

Examines methods and techniques of conducting and evaluating rehabilitation research; experimental and survey designs and procedures; data collection and current directions of rehabilitation research. *Prerequisite:* REHAB 301, EDPSY 390, and consent of instructor. 1 unit.

420. Social Psychology of Persons with Disabilities

Same as SP ED 420. Study of the social and emotional adjustment of individuals with disabilities; evaluation of effects imposed by societal attitudes; analysis of the implications for rehabilitation professionals in dealing with individuals who have a disability; review of relevant research. *Prerequisite:* REHAB 301 and 302, and consent of instructor. 1 unit.

421. Rehabilitation Administration

Overview of rehabilitation management in the public and private sectors; emphasis on rehabilitation service delivery and the interface of rehabilitation administration, supervision, and service delivery to all persons with disabilities; coverage of construct areas such as the State/Federal System of Vocational Rehabilitation Education, and private sector facilities; emphasis on the organizational role and administrative practices, management, supervision, and other relevant areas of leadership development and modeling. *Prerequisite:* REHAB 301, 401, SP ED 410, or consent of instructor. 1 unit.

436. Vocational Evaluation

Encompasses both the theory and practice of vocational evaluation techniques for persons with disabilities. Reviews basic psychometric instruments and adds practical experience with work samples and computer-based testing. Taught in the Rehabilitation Education Research and Evaluation Center and includes hands-on experience in the evaluation of disabled clients. *Prerequisite:* REHAB 301, or one basic course in testing. 4 hours or 1 unit.

437. Introduction to Neuropsychological Testing for Rehabilitation Counselors

Use by rehabilitation counselors of neuropsychological test batteries and other related tests; particular emphasis on understanding test reports and useful applications for neuropsychological testing in terms of rehabilitation clients. *Prerequisite:* REHAB 301; consent of instructor. 1 unit.

483. Supervised Practice in Rehabilitation Counseling

Development of individual counseling skills in a rehabilitation setting; emphasis on vocational evaluation and placement skills as developed in case management and planning experiences as well as adjustment to disability, vocational choice, and job placement techniques. *Prerequisite:* REHAB 301, 420, 436, and consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

491. Seminar in Rehabilitation

Interdisciplinary seminar on topics of current interest. Students, faculty, and visiting lecturers present seminars based on their study, research or professional activities in the selected rehabilitation topic area. *Prerequisite:* Consent of instructor. ½ unit. May be repeated to a maximum of 1 unit.

493. Special Problems in Rehabilitation

Independent research on special projects. Open only to majors. *Prerequisite:* REHAB 301; consent of instructor. ½ unit. May be repeated to a maximum of 2 units.

494. Special Topics

Lecture course on topics of current interest; specific subject matter announced in *Timetable*. *Prerequisite:* Will be determined for each topic and will be indicated in *Timetable*; REHAB 301; consent of instructor. ½ to 1 unit. May be repeated to a maximum of 2 units.

499. Thesis Research

Preparation of thesis in rehabilitation. *Prerequisite:* Satisfactory standing in the master's program. 0 to 2 units. May be repeated to a maximum of 2 units.

COMPARATIVE LITERATURE

Acting Director of Program: Jean-Philippe Mathy

Program Office: 3080 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 333-4987

URL: www.lang.uiuc.edu/complit/clhomepage.html

Comparative Literature (C LIT)**119. The Literature of Fantasy**

Same as ENGL 119. See ENGL 119.

120. Origins of Western Literature

Same as CLCIV 120. See CLCIV 120.

141. Masterpieces of Western Culture, I

Comparative study of selected works reflecting main currents of Western literature and thought, such as biblical stories, Homer, Greek drama, Vergil, medieval romance and love lyrics, Dante, Boccaccio, Chaucer, Petrarch, Rabelais, Cervantes, and Shakespeare. *Prerequisite:* Completion of campus Composition I general education requirement (applies to writing-intensive sections taken for Composition II credit). 3 hours.

142. Masterpieces of Western Culture, II

Comparative study of selected works reflecting main currents of Western literature and thought, such as Moliere, Voltaire, Swift, Goethe, romantic lyrics, Melville, Flaubert, Dostoevsky, Ibsen, Joyce, Kafka, and Camus. *Prerequisite:* Completion of campus Composition I general education requirement (applies to writing-intensive sections taken for Composition II credit). 3 hours.

151. Cross-Cultural Thematics

Explores a combination of Western and non-Western literature through the focus on a shared theme, exploring differences in treatment both within and among different cultures. Two such thematic focuses are offered in rotation; one on concepts of love and one on ways of writing about death. Both themes introduce students to a wide array of famous texts from different cultures and also offer some varied perspectives for their own inevitable thoughts on these major topics. 3

hours. May be repeated to a maximum of 6 hours for different themes. If different topics are offered simultaneously, students may register for two different sections for a total of 6 hours.

175. Masterpieces of East Asian Literature
Same as EALC 175. See EALC 175.

189. Classic Masterpieces of Non-Western Cultures

Analysis of representative works from the Middle East and Asia through the seventeenth century, portraying literary, philosophical and religious achievements of the Islamic, Hindu, Buddhist and Confucian traditions, and emphasizing comparative perspectives both within the range of non-Western traditions and in juxtaposition to Western thinking. 3 hours. All readings in English.

190. Modern Masterpieces of Non-Western Cultures

Analysis of representative works from the Middle East and Asia of the eighteenth to twentieth centuries, portraying literary, philosophical and religious achievements of the Islamic, Hindu, Buddhist and Confucian traditions and emphasizing comparative perspectives both within the range of non-Western traditions and in juxtaposition to Western thinking. All readings in English. 3 hours.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Comparative Literary Studies, I

Introduction to various methods in comparative literary study, including genres, thematics, literary relations, literary movements, and interdisciplinary approaches. *Prerequisite:* One semester of college literature or consent of instructor. 3 hours.

202. Literature and Ideas

Analysis of several important world-views in Western civilization (such as classical, Romantic, modern, and so forth), studied comparatively and in relation to selected figures in Western literature. *Prerequisite:* CLIT 141 and 142; or one year of college literature; or consent of instructor. 3 hours.

203. Introduction to Persian Culture and Literature, I

Same as PERS 205. See PERS 205.

204. Introduction to Persian Culture and Literature, II

Same as PERS 206. See PERS 206.

207. Classical Chinese Literature

Same as EALC 207. See EALC 207.

210. Introduction to Modern African Literature

Same as AFRST 210 and ENGL 211. See AFRST 210.

211. Japanese Literature in Translation, I
Same as EALC 205. See EALC 205.

212. Japanese Literature in Translation, II
Same as EALC 206. See EALC 206.

213. African Oral Literature

Same as AFRST and ANTH 213. See AFRST 213.

215. The Scandinavian Novel: Masterpieces in English Translation
Same as SCAN 215. See SCAN 215.

218. Japanese Hero Types

Same as EALC 218. See EALC 218.

219. Women in Japanese Literature

Same as EALC and W S 219. See EALC 219.

224. German Literature in Translation

Same as GER 200. See GER 200.

225. Gods and Man in Modern Japanese Drama

Same as EALC and RELST 225. See EALC 225.

228. Special Topics in German Literature

Same as GER 296. See GER 296.

240. Italian Civilization of the Middle Ages and Renaissance

Same as ITAL 240. See ITAL 240.

244. Hispanic Literature and Culture

Same as SPAN 244. See SPAN 244.

248. Dostoevsky and Tolstoy

Same as RUSS 222. See RUSS 222.

249. Soviet and Post-Soviet Russian Literature

Same as RUSS 225. See RUSS 225.

250. Grimms' Fairy Tales in Their European Context

Same as GER 250 and ENGL 267. See GER 250.

252. Viking Sagas in Translation

Same as SCAN 252. See SCAN 252.

253. Medieval Literature and Culture

Same as ENGL 202. See ENGL 202.

255. Renaissance Literature and Culture

Same as ENGL 204. See ENGL 204.

257. Literature and Culture of the Enlightenment

Same as ENGL 206. See ENGL 206.

262. Sex and Gender in Classical Antiquity

Same as CLCIV and W S 240. See CLCIV 240.

263. The Heroic Tradition

Same as CLCIV 221. See CLCIV 221.

264. The Tragic Spirit

Same as CLCIV 222. See CLCIV 222.

265. Development of the Modern Drama

Same as ENGL 243. See ENGL 243.

266. Development of the Modern Drama

Same as ENGL 244. See ENGL 244.

267. The Short Story

Same as ENGL 245. See ENGL 245.

268. The Short Story

Same as ENGL 246. See ENGL 246.

269. Modern British and American Fiction in Relation to Continental Fiction

Same as ENGL 248. See ENGL 248.

283. Jewish Sacred Literature

Same as ENGL and RELST 283. See RELST 283.

284. Modern Jewish Literature

Same as ENGL and RELST 284. See ENGL 284.

293. Senior Thesis and Honors

Independent research guided by tutor(s), leading to the writing of a comparative thesis. Intended primarily for candidates for honors in comparative literature, but open to other seniors. 3 to 6 hours. May be repeated to a maximum of 12 hours. (Counts for advanced hours in L.A.S.)

295. Special Topics: Colloquium on Interdisciplinary Subjects

Presentation and discussion of subjects relating literature to other disciplines; topic varies. 3 hours. May be repeated to a maximum of 6 hours.

305. Literary Criticism from 1800 to the Present

Same as ENGL 383. See ENGL 383.

307. Topics in Classical Literature

Same as CLCIV 390. See CLCIV 390.

310. Modern African Fiction

Same as AFRST and FR 310, and ENGL 370. See AFRST 310.

311. The Chinese Novel

Same as EALC 311. See EALC 311.

312. Modern Chinese Literature in Translation

Same as EALC 312. See EALC 312.

313. Dante

Same as ITAL 313. See ITAL 313.

314. Petrarch and Boccaccio: Literature of the Italian Middle Ages

Same as ITAL 314. See ITAL 314.

315. Modern Japanese Fiction in Translation

Same as EALC 315. See EALC 315.

320. Masterpieces of Italian Renaissance Literature

Same as ITAL 320. See ITAL 320.

328. Japan at War and Peace

Same as EALC 328. See EALC 328.

334. Studies in Francophonie

Same as FR 379. See FR 379.

335. Polish Literature in Translation, I

Same as POL 345. See POL 345.

336. Polish Literature in Translation, II

Same as POL 346. See POL 346.

337. Nineteenth-Century Literature in Translation

Same as RUSS 315. See RUSS 315.

338. Twentieth-Century Literature in Translation

Same as RUSS 317. See RUSS 317.

340. Studies in Russian Literature and Society

Same as RUSS 360. See RUSS 360.

341. Themes and Types in Western and Non-Western Narratives

Analysis of literary themes and types in narratives of Western and non-Western literature (e.g., the hero, east and west, dream visions), emphasizing comparative perspectives. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours, or $\frac{3}{4}$ to 1 unit. May be repeated to a maximum of 9 hours or 3 units.

357. Russian Modernism

Same as RUSS 324. See RUSS 324.

361. International Literary Genres and Forms

Structure and development of literary genres and forms in historical perspective (for instance, drama, parody and the grotesque, poetry, fables and fabulists, and modern fiction); essential international components and significant national variations of such genres and forms. Emphasis changes from semester to semester. *Prerequisite:* One year of college literature or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated to a maximum of 9 hours or 3 units.

363. Ibsen in Translation

Same as THEAT and SCAN 363. See SCAN 363.

364. Strindberg in Translation

Same as SCAN and THEAT 364. See SCAN 364.

365. Comedy

Same as ENGL 365. See ENGL 365.

368. Russian Drama

Same as RUSS 335. See RUSS 335.

371. International Literary Relations

Study of specific relations between authors of different countries; influences of certain works, concepts, or tastes on another work, author, or country; and literary interaction between Eastern and Western cultures. Emphasis changes from semester to semester. *Prerequisite:* One year of college literature or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated to a maximum of 9 hours or 3 units.

375. Women and Society in Scandinavian Literature

Same as SCAN and W S 375. See SCAN 375.

377. East European Literatures

Same as SLAV 377. See SLAV 377.

388. French and Comparative Cinema, I

Same as FR, CINE, and HUMAN 388. See FR 388.

389. French and Comparative Cinema, II

Same as FR, CINE, and HUMAN 389. See FR 389.

396. Special Topics in Comparative Literature

Selected literary topics of international significance in relation to other cultural expressions. *Prerequisite:* Consent of instructor. 3 hours, or $\frac{3}{4}$ to 1 unit. May be repeated to a maximum of 9 hours or 3 units.

401. Theory of Literature

Major issues of literary theory, critical approaches, and comparative research. *Prerequisite:* Knowledge of two languages other than English or (with instructor's consent) advanced knowledge of one foreign language. 1 unit.

402. Cross-Cultural Comparison

Problems and methods of cross-cultural literary studies, concentrating on the effects of historical encounters between different civilizations and on theoretical issues in comparing literatures across cultures. *Prerequisite:* Knowledge of two languages other than English or (with instructor's consent) advanced knowledge of one foreign language. 1 unit.

411. Studies in Critical Theory

Same as GER 470. See GER 470.

451. Seminar in Literary Movements and Periods

Investigation of the development and mutation of literary movements (classicism, romanticism, symbolism, etc.) through a study of critical texts and their reception in various countries. 1 unit. May be repeated as topics vary to a maximum of 3 units.

461. Seminar in Literary Genres and Forms

Study of a form (the lyric, the novel, the drama, etc.) to discover its essential components in all the literatures studied and the significance of national variations. 1 unit. May be repeated as topics vary to a maximum of 3 units.

471. Seminar in Literary Relations

Investigation of the impact of one literature upon another, or of some specific works upon others (the role of English literature in continental Europe, the influence of Russian novelists on French and German writers, etc.). 1 unit. May be repeated as topics vary to a maximum of 3 units.

472. Studies in French and Comparative Cinema

Same as FR 452. See FR 452.

478. Seminar in Twentieth-Century French Literature

Same as FR 478. See FR 478.

480. Teaching Comparative Literature

Introduction to the college-level teaching of comparative literature, usually associated with the supervision of teaching practice. Required of new teaching assistants in the Comparative Literature program, but may be taken by other Comparative Literature students. $\frac{1}{2}$ unit.

481. Seminar in Literary Themes and Types
Study of a theme or type (the Faust myth, the romantic hero, etc.) to discover its essential components in all the literatures studied and the significance of national variations. The subject of the seminar varies each semester. 1 unit. May be repeated as topics vary to a maximum of 3 units.

490. Seminar in Contemporary Criticism, Methods and Theory

Same as FR 490. See FR 490.

493. Special Studies

$\frac{1}{4}$ to 1 unit.

499. Thesis Research

Intended for students engaged in writing a thesis as a partial requirement for the M.A. or Ph.D. degree in comparative literature. 0 to 4 units. Maximum credit for master's candidates is 2 units.

COMPUTATIONAL SCIENCE AND ENGINEERING

Director of Program: Michael T. Heath
Administrative Office: 2262 Digital Computer Laboratory, 1304 West Springfield Avenue, Urbana
Phone: 333-0654
URL: www.cse.uiuc.edu

Computational Science and Engineering (CSE)

301. Numerical Analysis: A Comprehensive Introduction

Same as C S and MATH 350, and ECE 391. See C S 350.

302. Introduction to Parallel Programming for Scientists and Engineers

Same as C S 320 and ECE 392. See C S 320.

305. Data Structures for Noncomputer Majors

Same as C S 300. See C S 300.

306. Software Design and Development for Noncomputer Majors

Same as C S 302. See C S 302.

311. Numerical Methods for Partial Differential Equations

Same as C S 355 and MATH 355. See C S 355.

312. Numerical Linear Algebra

Same as C S 358 and MATH 358. See C S 358.

313. Numerical Approximation and Ordinary Differential Equations

Same as C S and MATH 359. See C S 359.

314. Combinatorial Algorithms

Same as C S and MATH 373. See C S 373.

315. Computer Methods in Civil and Environmental Engineering
Same as CEE 391. See CEE 391.

322. Computer System Organization
Same as C S 333. See C S 333.

323. Operating Systems Design
Same as C S 323. See C S 323.

324. Distributed Systems
Same as C S and ECE 328. See C S 328.

325. Communication Network for Computers
Same as C S and ECE 338. See C S 338.

326. Software Engineering
Same as C S 327. See C S 327.

327. Computer Graphics
Same as C S 318. See C S 318.

328. Advanced Topics in Computer Graphics
Same as C S 319. See C S 319.

333. Introduction to VLSI System Design
Same as C S 335 and ECE 325. See ECE 325.

341. Introduction to Optimization
Same as ECE 390. See ECE 390.

350. Introduction to Computational Mechanics
Same as T A M 370. See T A M 370.

351. Introduction to Finite Element Analysis
Same as M E 345. See M E 345.

353. Finite Element Methods in Aerospace Structures
Same as A A E 320. See A A E 320.

361. Computational Aerodynamics
Same as A A E 310. See A A E 310.

362. Safety Analysis of Nuclear Reactor Systems
Same as NUC E 357. See NUC E 357.

372. Computer Simulation Studies in the Physical and Social Sciences
Same as MATSE 382 and ECON 370. See MATSE 382.

373. Atomic-Scale Simulations
Same as PHYCS 363, and MATSE 385. See MATSE 385.

411. Iterative and Multigrid Solvers
Same as C S 450. See C S 450.

412. Parallel Numerical Algorithms
Same as C S 454 and MATH 486. See C S 454.

413. Topics in Numerical Analysis
Same as C S and MATH 458. See C S 458.

414. Geometry and Topology of Grid Generation
Same as C S 470. See C S 470.

415. Topics in Analysis of Algorithms
Same as C S 473. See C S 473.

417. Advanced Finite-Element Methods
Same as T A M 474. See T A M 474.

421. Computer Architecture
Same as ECE 412. See ECE 412.

422. Theory of High-Speed Parallel Computation
Same as C S and ECE 433. See C S 433.

423. Advanced Operating Systems
Same as C S 423. See C S 423.

424. Computer Systems Analysis
Same as C S and ECE 441. See C S 441.

426. Topics in Compiler Construction
Same as C S 426. See C S 426.

428. High Performance Computer Architectures: Hardware and Software
Same as ECE 411. See ECE 411.

432. Computational Techniques for Circuit Analysis and Design
Same as ECE 452. See ECE 452.

434. Advanced Theory of Semiconductors and Semiconductor Devices
Same as ECE 439. See ECE 439.

442. Digital Signal Processing
Same as ECE 451. See ECE 451.

443. Image Processing
Same as ECE 447. See ECE 447.

444. Power System Dynamics and Stability
Same as ECE 476. See ECE 476.

445. Power System Control
Same as ECE 473. See ECE 473.

451. Finite Element Methods in Solid and Structural Mechanics
Same as CEE 478. See CEE 478.

460. Advanced Numerical Methods for Computational Fluid Mechanics
Same as T A M 470. See T A M 470.

464. Modeling of Water Quality in Natural Systems
Same as CEE 441. See CEE 441.

465. Modeling of Groundwater Flow and Solute Transport
Same as CEE 457. See CEE 457.

466. Numerical Methods in Fluid Dynamics
Same as ATMOS and C S 405. See ATMOS 405.

467. Dynamical Weather Prediction
Same as ATMOS 406. See ATMOS 406.

468. Global Atmospheric Modeling
Same as ATMOS 442. See ATMOS 442.

481. Special Topics in Chemical Engineering
Same as CH E 469. See CH E 469.

COMPUTER SCIENCE

Head of Department: Daniel A. Reed
Department Office: 2270 Digital Computer Laboratory, 1304 West Springfield Avenue, Urbana
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Computer Science (C S)

100. Freshman Orientation in Computer Science

Introduction to Computer Science as a field and career for computer science majors. Overview of the field is presented along with specific examples of problem areas and methods of solution. *1 hour.* Recommended for all freshman Computer Science majors.

101. Introduction to Computing with Application to Engineering and Physical Science

Fundamental principles, concepts, and methods of computing, with emphasis on applications in the physical sciences and engineering. Basic problem solving and programming techniques; fundamental algorithms and data structures; use of computers in solving engineering and scientific problems. *Prerequisite:* MATH 120 or 135. *3 hours.* Students may not receive credit for this course and any of C S 102, 103, 105 or the C section of C S 110.

105. Introduction to Computing for Nontechnical Majors

Introduction to computing as an essential tool of academic and professional activities in disciplines other than Science and engineering. Functions and interrelationships of computer system components: hardware, systems and applications software, networks. Widely used application packages such as spreadsheets and databases. Concepts and practice of programming for the solution of simple problems in different application areas. Students interested in Scientific and engineering applications of computing should take C S 101 instead of this course. *Prerequisite:* MATH 112 or equivalent. Students may not receive credit for both C S 105 and 101. *3 hours.*

110. Programming Laboratory

Practical laboratory course in the methods used and skills required for writing and maintaining well-structured software. Extensive practice with a programming language is provided. Different sections use different programming languages. An existing knowledge of fundamental computing principles is assumed. Three laboratory hours per week. *Prerequisite:* C S 101, 105, 125, or consent of instructor. It is recommended that students enrolling in CP sections of this course have prior C programming experience or have taken C S 110C. *1 hour.* Students may not receive credit for studying any given language more than once. (That is, they may take a given

section only once.) Students may not receive credit for both C S 101 and 110C, both C S 125 and C S 110J, or both C S 223 and C S 110CP.

Section C: C Programming Laboratory.

Section CP: C++ Programming Laboratory.

Section F: Fortran Programming Laboratory.

Section M: Mathematica Programming Laboratory.

Section J: Java Programming Laboratory.

Section P: Pascal Programming Laboratory.

125. Introduction to Computer Science

First course for computer science majors and other students with a deep interest in computing. The course introduces students to basic concepts in computing and fundamental techniques for solving computational problems. *Prerequisite:* Three years of high school mathematics or MATH 112. 4 hours.

173. Discrete Mathematical Structures

Studies discrete mathematical structures frequently encountered in the study of Computer Science. Topics will include sets, propositions, boolean algebra, induction, recursion, relations, functions, and graphs. 2 hours. Students may not receive credit for both C S 173 and MATH 213.

196. Honors Course in Computer Science

Course is offered for honors credit in conjunction with other 100-level computer science courses, in which concurrent registration is required. Enrollment is strictly limited to beginning students with superior talents in computer science. A special examination may be required for admission to this course. *Prerequisite:* Concurrent registration in another 100-level computer science course (see *Timetable*); consent of instructor. 1 hour. May be repeated.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

225. Data Structures and Software Principles

Data abstractions: elementary data structures: lists, stacks, queues, trees; searching and sorting techniques. Introduction to the principles of software engineering including semester programming project. *Prerequisite:* C S 125 or both C S 110C and junior standing; C S 173 or MATH 213 or consent of instructor. 4 hours.

231. Computer Architecture, I

Introduction to computer architecture, working up from the logic gate level: combinational and sequential networks; computer arithmetic; arithmetic/logic units; memory organization; control unit design. *Prerequisite:* C S 125. 3 hours. Students may not receive credit for both C S 231 and ECE 290.

232. Computer Architecture, II

Second-level course in computer architecture: machine-level programming, instruction sets, data representations; subroutines; input/output hardware and software; linking and loading; relation to high-level languages. *Prerequisite:* C S 223 and 231. 3 hours. Students may not receive credit for both C S 232 and ECE 291.

257. Numerical Methods

Same as MATH 257. Introduction to numerical methods for students in science and engi-

neering; topics include floating-point computation, systems of linear equations, approximation of functions and integrals, the single nonlinear equation, and the numerical solution of ordinary differential equations; discusses various applications in science and engineering; includes some programming as well as the use of high quality mathematical library routines. *Prerequisite:* A 100-level computer science course; MATH 225 or 315; MATH 242. 3 hours. Students with earned credit in C S or MATH 350 may not receive additional credit for C S or MATH 257.

273. Introduction to Theory of Computation

Introduction to the various aspects of the theory of computation, including the necessary background in first order predicate logic, combinatorics, and recurrence relations; asymptotics; basics of algorithm analysis; NP-completeness; formal languages and automata. *Prerequisite:* C S 125 and 173 or equivalent, or consent of instructor. 3 hours.

290. Individual Study

Prerequisite: 100-level computer science course. 1 to 3 hours. May be repeated.

292. Senior Project in Computer Science, I

First part of a project course in computer science. Students work in teams to solve typical commercial or industrial problems. Work involves planning, design, and implementation. Extensive oral and written work is required both on-campus and possibly off-campus at sponsors' locations. Students must enroll for a two semester sequence, C S 292 and 293. *Prerequisite:* Senior standing in C S or consent of instructor. 3 hours. Students may not receive credit for both this project course and a project course in another engineering department for the same project.

293. Senior Project in Computer Science, II

Continuation of a project course in computer science. Students work in teams to solve typical commercial or industrial problems. Work involves planning, design, and implementation. Extensive oral and written work is required both on-campus and possibly off-campus at sponsors' locations. *Prerequisite:* C S 292. 3 hours. Students must enroll for a two semester sequence, C S 292 and 293. Students may not receive credit for both this project course and a project course in another engineering department for the same project.

296. Honors Course in Computer Science

Group projects for honors work in computer science. Sections of this course are offered in conjunction with other 200-level computer science courses, in which concurrent registration is required. A special examination may be required for admission to this course. *Prerequisite:* Concurrent registration in another 200-level computer science course (see *Timetable*); consent of instructor. 1 hour. May be repeated.

297. Special Topics in Computer Science

Lecture course in topics of current interest. See *Timetable* for current topics. *Prerequisite:* Consent of instructor. 2 to 4 hours. May be repeated.

299. Senior Thesis in Computer Science

Research and thesis development experience in computer science. A student works with a faculty member on a mutually agreed upon thesis topic and completes a written thesis. Work involves literature search, oral presentation, analysis and/or implementation, paper preparation, and a written thesis. *Prerequisite:* Senior standing in C S and consent of instructor. 3 hours. May be repeated to a maximum of 6 hours.

300. Data Structures for Noncomputer Majors

Same as CSE 305. Introduction to the concepts, principles, and use of computing data structures for noncomputer majors. Topics include pointers, lists, stacks, trees, hashing, graphs, and sorting. Prior experience with the C programming language is assumed. This course meets for half a semester. *Prerequisite:* C S 110C or equivalent or consent of instructor. 2 hours or ½ unit. Students may not receive credit for both C S 300 and C S 225. Computer Science and Computer Engineering majors may not receive credit for C S 300.

301. Files and Information Systems for Noncomputer Majors

Introduction to the concepts, principles, and use of computing information systems for noncomputer majors. Topics include file organization and processing, file storage devices, sorting and retrieval of information, and an introduction to database concepts. This course meets for half a semester. *Prerequisite:* C S 110 or C S 125 or equivalent or consent of instructor. 2 hours or ½ unit. Graduate students in Computer Science may not receive credit for C S 301.

302. Software Design and Development for Noncomputer Majors

Same as CSE 306. Introduction to the concepts, principles, and practices used in modern software design and development for noncomputer majors. Topics include software life cycle, planning, requirements, design, testing, and maintenance. Introduction to the use of CASE tools. Course meets for half a semester. *Prerequisite:* C S 300 or equivalent or consent of instructor. 2 hours or ½ unit. Students may not receive credit for both C S 302 and C S 327. Computer Science and Computer Engineering majors may not receive credit for C S 302.

303. Computer Device Interfacing for Noncomputer Majors

Introduction to the concepts, principles, and use of computer interfacing mechanisms. Designed for students not majoring in computer science or computer engineering, the course deals with hardware and software issues of interfacing a computer to various types of input/output and scientific equipment. Topics include standard interfaces, digital-to-analog and analog-to-digital conversion, digital signal processing and networking. This course meets for half a semester. *Prerequisite:* C S 110 or equivalent or consent of instructor. 2 hours or ½ unit. Students may not receive credit for both C S 303 and C S 384. Computer Science and Computer Engineering majors may not receive credit for C S 303.

304. Computer User Interfaces and Visualization for Noncomputer Majors

Introduction to the concepts, principles, and use of computer user interfaces for noncomputer majors. Topics include window systems, user interfaces, visualization, graphics, and multimedia. Prior experience with the C programming language is assumed. This course meets for half a semester. *Prerequisite:* C S 110C or equivalent or consent of instructor. 2 hours or $\frac{1}{2}$ unit. Students may not receive credit for both C S 304 and C S 318. Computer Science and Computer Engineering majors may not receive credit for C S 304.

311. Database Systems

Examines the logical organization of databases: the entity-relationship model; the hierarchical, network, and relational data models and their languages. Functional dependencies and normal forms. Design, implementation, and optimization of query languages; security and integrity; concurrency control, and distributed database systems. *Prerequisite:* C S 225 or 300; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

313. Combinatorial Mathematics

Same as MATH 313. See MATH 313.

314. Multimedia Systems

Organization and structure of modern multimedia systems; audio and video encoding; quality of service concepts; scheduling algorithms for multimedia within OS and networks multimedia protocols over high-speed networks; synchronization schemes, user-interface design; multimedia teleservices. *Prerequisite:* C S 323. 3 hours or $\frac{3}{4}$ or 1 unit. For 1 unit credit additional work is required.

317. Computer-Assisted Instruction

Same as C & I 335. See C & I 335.

318. Computer Graphics

Same as CSE 327. Software, hardware, and mathematical tools for the representation, manipulation, and display of topological and two- and three-dimensional objects; applications of these tools to specific problems. *Prerequisite:* C S 225 or 300, and analytic geometry. 3 hours, or $\frac{3}{4}$ or 1 unit.

319. Advanced Topics in Computer Graphics

Same as CSE 328. Advanced methods for representing, displaying, and rendering two-, three-, and four-dimensional scenes. General algebraic curves and surfaces, splines, Gaussian and bump-function representation, fractals, particle systems, constructive solid geometry methods, lighting models, radiosity, advanced ray-tracing methods, surface texturing animation techniques, data visualization methods. *Prerequisite:* C S 318. 3 hours or $\frac{3}{4}$ or 1 unit.

320. Introduction to Parallel Programming for Scientists and Engineers

Same as CSE 302 and ECE 392. Introduction to fundamental issues in design and development of parallel programs for various types of parallel computers. Various programming models according to both machine type and application area. Cost models, debugging, and performance evaluation of parallel programs with actual application examples. *Pre-*

requisite: C S 110 or 223; and C S 300 or 225, or advanced programming experience. 3 hours, or $\frac{3}{4}$ or 1 unit.

321. Programming Languages and Compilers

Introduction to the structure of programming languages and their implementation. Basic language design principles; abstract data types (lists, arrays, user-defined types); functional languages; type systems; object-oriented languages. Basics of lexing, parsing, syntax-directed translation, semantic analysis and code generation. *Prerequisite:* C S 225, and C S 231 or 232 or ECE 290 or 291. 3 hours, or $\frac{3}{4}$ or 1 unit.

322. Programming Language Design

Advanced course in principles of language design. Using imperative and functional programming as unifying themes, major language design paradigms will be explored. Tools in this study will include both practical language processor construction and theoretical models. Emphasis will be on reasoning about programs and languages. *Prerequisite:* C S 321. 3 hours, or $\frac{3}{4}$ or 1 unit.

323. Operating Systems Design

Same as CSE 323. The organization and structure of modern operating systems and concurrent programming concepts. Deadlock, virtual memory, processor scheduling, and disk systems. Performance, security, and protection. *Prerequisite:* C S 225, and C S 232 or ECE 291. 3 hours, or $\frac{3}{4}$ or 1 unit.

324. Real-Time Systems

Examples of real-time computing systems; real-time scheduling and resource management algorithms; analytical and efficient validation methods; examples of real-time operating systems; temporal consistency of real-time data; formal methods for specification of and reasoning about timing constraints. *Prerequisite:* C S 323. 3 hours, or $\frac{3}{4}$ or 1 unit.

326. Compiler Construction

Compiler structure, syntax analysis, syntax-directed translation, automatically constructed recognizers, semantic analysis, code generation, intermediate language, optimization techniques. *Prerequisite:* C S 232 or ECE 291; and C S 321. 3 hours, or $\frac{3}{4}$ or 1 unit.

327. Software Engineering

Same as CSE 326. Follows the software life cycle from the requirement, specification, and design phases through the construction of actual software. Topics include management of programming teams, programming methodologies, debugging aids, documentation, evaluation and measurement of software, verification and testing techniques, and the problems of maintenance, modification, and portability. *Prerequisite:* C S 225. 3 hours, or $\frac{3}{4}$ or 1 unit.

328. Distributed Systems

Same as CSE 324 and ECE 328. Covers topics needed for a basic understanding of distributed computer systems: Protocols, specification techniques, global states and their determination, reliable broadcast, transactions and commitment, security, and real-time systems.

Prerequisite: C S 323 or equivalent, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

331. Embedded Systems Architectures

Survey of sampled data systems and embedded applications; principles and characteristics of sensors and devices; embedded microprocessors; processor/device interfaces; time-critical I/O handling; data communications in embedded environments. Overview of embedded operating systems, cross development and debugging techniques and tools. *Prerequisite:* C S 232 or ECE 291 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

333. Computer System Organization

Same as CSE 322. Computer system analysis and design. Organizational dependence on computations to be performed. Speed and cost of parts and overall machines. Instruction set design. Pipeline and vector machines. Memory hierarchy design. *Prerequisite:* C S 231 or ECE 290; C S 232 or ECE 291. 3 hours, or $\frac{3}{4}$ or 1 unit.

335. Introduction to VLSI System Design

Same as ECE 325 and CSE 333. See ECE 325.

336. Advanced VLSI Design Projects

Same as ECE 326. See ECE 326.

337. VLSI System and Logic Design

Computer system design of VLSI chips with emphasis on logic design. Overview of VLSI technology; detailed discussion of recent integrated circuit logic families; types of memories and contemporary logic design methods based on them, including various custom design approaches; automated logic synthesizers; Binary Decision Diagrams; Field Programmable Gate Arrays; hardware/software realization of algorithms; and hardware/software tradeoffs for improving system performance and lowering costs. *Prerequisite:* C S 231 or ECE 290 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

338. Communication Networks for Computers

Same as CSE 325 and ECE 338. Introduction to International Standards Organization Open System Interconnection (ISO-OSI) reference model, design issues and protocols in the physical layer, data link layer and network layer; architectures and control algorithms of local-area networks, point-to-point networks and satellite networks; standards in network access protocols; models of network interconnection; and overview of networking and communication software. *Prerequisite:* C S 231 or ECE 290. 3 hours or $\frac{3}{4}$ unit.

343. Introduction to Robotics

Same as ECE and G E 370. See ECE 370.

344. Robot Sensing

Same as ECE and G E 379. See ECE 379.

346. Pattern Recognition and Machine Learning

Organized review of basic theoretical concepts and methods of machine learning and recognition; decision space and linguistic and relational representation of objects; statistical and deterministic recognition algorithms; various types of learning, including adaptive, proce-

dural, and inductive; selected applications; and medical consulting, determination of cost-optimal classification rules, inferential information systems, and computer vision. *Prerequisite:* C S 273 and 348. 3 hours, or $\frac{3}{4}$ or 1 unit.

347. Knowledge-Based Programming

Examines use of the computer to process human-made knowledge-bases. Topics include: trade-off of search versus knowledge; complexity of finite problem-domains; machine-aided acquisition of knowledge from experts; acquisition of knowledge by computer induction; validation and measurement methods, production-rule programming; and logic programming. *Prerequisite:* C S 273 and 348. 3 hours, or $\frac{3}{4}$ or 1 unit.

348. Introduction to Artificial Intelligence

Same as ECE 348. Introductory description of the major subjects and directions of research in artificial intelligence; topics include AI languages (LISP and PROLOG), basic problem solving techniques, knowledge representation and computer inference, machine learning, natural language understanding, computer vision, robotics, and societal impacts. *Prerequisite:* C S 225 or ECE 291; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

350. Numerical Analysis: A Comprehensive Introduction

Same as CSE 301, ECE 391 and MATH 350. Introduction to numerical analysis that includes linear system solvers, optimization techniques, interpolation and approximation of functions, solving systems of nonlinear equations, eigenvalue problems, least squares, and quadrature, as well as numerical handling of ordinary and partial differential equations. *Prerequisite:* C S 101 or 125; C S 257 or MATH 315; MATH 285 or 341; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

355. Numerical Methods for Partial Differential Equations

Same as CSE 311 and MATH 355. Introduction to numerical techniques for initial and boundary value problems in partial differential equations; includes finite difference and finite element discretization techniques, direct and iterative solution methods for discrete problems, and programming techniques and usage of FORTRAN packages. *Prerequisite:* C S 257; MATH 280, 285, or 341. 3 hours, or $\frac{3}{4}$ or 1 unit.

358. Numerical Linear Algebra

Same as CSE 312 and MATH 358. Direct and iterative methods for systems of linear equations; over determined systems of equations; eigenvalue problems; nonlinear systems of equations. *Prerequisite:* C S 257 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

359. Numerical Approximation and Ordinary Differential Equations

Same as CSE 313 and MATH 359. Polynomial and spline interpolation; least squares and uniform approximation; numerical differentiation and integration; initial-value and boundary-value problems in ordinary differential equations. *Prerequisite:* C S 257 and MATH 285 or 341, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

362. Logic Design

Same as ECE 362 and MATH 391. See ECE 362.

373. Combinatorial Algorithms

Same as CSE 314 and MATH 373. Advanced data structures, graph algorithms, arithmetic algorithms, geometric algorithms, string problems, parallel algorithms, NP-completeness. *Prerequisite:* C S 225 and 273, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

375. Automata, Formal Languages, and Computational Complexity

Same as MATH 375. Finite automata and regular languages; pushdown automata and context-free languages; Turing machines and recursively enumerable sets; linear-bounded automata and context-sensitive languages; computability and the halting problem; undecidable problems; recursive functions; Chomsky hierarchy; computational complexity. *Prerequisite:* C S 273 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

376. Program Verification

Examines formal methods for demonstrating correctness and other properties of programs; includes an overview of predicate calculus. Topics include: invariant assertions, Hoare axiomatics, well-founded orderings for proving termination, structural induction, computational induction, data structures, and parallel programs. *Prerequisite:* C S 225, and either C S 273 or MATH 314. 3 hours, or $\frac{3}{4}$ or 1 unit.

383. Linear Programming

Same as MATH 383. See MATH 383.

384. Computer Data Acquisition Systems

Theory, operation, and design of computer data acquisition systems; analog and digital aspects, conversions between representations, interfacing and systems considerations. *Prerequisite:* C S 231 or ECE 290; ECE 205 or 340. 3 hours, or $\frac{3}{4}$ or 1 unit.

391. Seminar in Computer Science

Seminar course for advanced undergraduate and graduate students. Topics will vary. *Prerequisite:* Varies with course topic; consent of instructor. 0 to 4 hours, 0 to 1 unit. Course may be repeated, but students may not take the same topic more than once unless the course material is different.

397. Special Topics in Computer Science

Lectures in topics of current interest. See *Time-table* for current topics. *Prerequisite:* Consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit. May be repeated.

405. Numerical Methods in Fluid Dynamics

Same as ATMOS 405. See ATMOS 405.

411. Design of Database Management Systems

The internal workings of database management systems: query interpretation, concurrency control, distribution, data buffering, schema management. Considers traditional database management systems and newer approaches. Presents and analyzes the course material in terms of a particular target application. *Prerequisite:* C S 311. 1 unit.

422. Programming Language Semantics

Topics in the theory of programming languages including: functional programming, meta-circular interpreters, typed, untyped and polymorphic lambda-calculi, and denotational semantics. *Prerequisite:* C S 322 and 326. 1 unit.

423. Advanced Operating Systems

Same as CSE 423. Advanced concepts in operating system design and coverage of recent research directions. Resource management for parallel and distributed systems. Interaction between operating system design and computer architectures. Topics include: process management, virtual memory, interprocess communication, context switching, parallel and distributed file system designs, persistent objects, process and data migration, load balancing, security, protection. Term projects. *Prerequisite:* C S 323, 328, and 333, or consent of instructor. 1 unit.

424. Foundations of Concurrent Programming Languages and Systems

Introduction to the theory of concurrency and concurrent programming languages. Topics include formal models of concurrent computation such as process algebras, nets and actors; high level concurrent programming languages and their operational semantics; and methods for reasoning about correctness and complexity of concurrent programs. *Prerequisite:* C S 322 and either C S 375 or 376, or equivalent. 1 unit.

426. Topics in Compiler Construction

Same as CSE 426. Advanced topics in compiler construction, including incremental and interactive compiling, error correction, code optimization, models of code generators, etc. *Prerequisite:* C S 326. 1 unit.

433. Theory of High-Speed Parallel Computation

Same as CSE 422 and ECE 433. Theoretical aspects of parallel and pipeline computation; time and processor bounds on classes of computations; data alignment network speed and cost bounds; conflict-free access memories; and overall computer system ideas. *Prerequisite:* Consent of instructor. 1 unit.

436. Design of Fault-Tolerant Digital Systems

Same as ECE 442. See ECE 442.

441. Computer Systems Analysis

Same as CSE 424 and ECE 441. Development of analytical models of computer systems and application of such models to performance evaluation; topics include scheduling policies, paging algorithms, multiprogrammed resource management, and queuing theory. *Prerequisite:* MATH 361 or 363, and ECE 313, or equivalent. 1 unit.

442. Artificial Neural Networks

Comprehensive treatment of neural network architectures and learning algorithms balanced with theory and application examples. *Prerequisite:* C S 348, MATH 285 and 315, or consent of instructor. 1 unit.

443. Computer Vision

Same as ECE 449. See ECE 449.

444. Design of Computer Problem Solvers
Same as ECE 444. Principles and engineering techniques for artificial intelligence problem-solving and inference systems; pattern-directed inference systems, including context mechanisms and efficiency issues; truth-maintenance systems, including basics of justification-based, logic-based, and assumption-based systems, dependency-directed search and closed-world reasoning, and integration with other reasoning modules; constraint languages, including applications to engineering systems; symbolic relaxation systems, including applications to vision and temporal reasoning; production rule languages; MYCIN-like rule languages. *Prerequisite:* C S 348. 1 unit.

445. Systems Modeling and Simulation
Same as B ADM 475. See B ADM 475.

448. Computer Models of Cognitive Processes
Same as ECE 448. Formal models and concepts in vision and language; detailed analysis of computer vision, language, and learning problems; relevant psychological results and linguistic systems; and survey of the state of the art in artificial intelligence. *Prerequisite:* C S 348. 1 unit.

449. Proseminar in Cognitive Science
Same as ANTH and LING 470; and EDPSY and PSYCH 471. See ANTH 470.

450. Iterative and Multigrid Solvers
Same as CSE 411. A comprehensive treatment of algebraic and multigrid iterative solvers for systems of equations, primarily linear equations arising from discretization of partial differential equations. *Prerequisite:* C S 350 or consent of instructor. 1 unit.

454. Parallel Numerical Algorithms
Same as CSE 412 and MATH 486. Introduction of numerical algorithms for parallel computers: parallel algorithms in numerical linear algebra (dense and sparse solvers for linear systems and the algebraic eigenvalue problem), numerical handling of ordinary and partial differential equations, and numerical optimization techniques. *Prerequisite:* At least one of: C S 350, 355, 358, or 359, or consent of instructor. 1 unit.

458. Topics in Numerical Analysis
Same as CSE 413, and MATH 458. *Prerequisite:* Consent of instructor. 1 unit. May be repeated.

469. Introduction to Coherent Optics and Holography
Same as ECE 469. See ECE 469.

470. Geometry and Topology of Grid Generation
Same as CSE 414. Design of geometric algorithms for grids and triangulations. Development of geometric and topological prerequisites (no prior course in these subjects is assumed). Topics include complexes, subdivisions, Delaunay triangulations, randomized algorithms, homology groups, splines and surfaces. *Prerequisite:* C S 373 or consent of instructor. 1 unit.

471. Combinatorial Mathematics
Same as MATH 470. See MATH 470.

472. Extremal Graph Theory
Same as MATH 417. See MATH 417.

473. Topics in Analysis of Algorithms
Same as CSE 415. Theoretical analysis of various algorithms; topics include sorting, searching, selection, polynomial evaluation, matrix multiplication, and multiplication of real numbers. *Prerequisite:* C S 373 or equivalent, or consent of instructor. 1 unit.

475. Methods of Combinatorics
Same as MATH 474. See MATH 474.

476. Topics in Automated Deduction
Advanced topics in computer-aided methods for formal deduction, selected from areas of current research, such as: resolution theorem proving strategies, special relations, equational reasoning, unification theory, rewrite systems, mathematical induction, program derivation, hybrid inference systems, and programming with logic. *Prerequisite:* C S 341 or consent of instructor. ½ to 1 unit. May be repeated.

477. Coding Theory
Same as ECE 456 and MATH 476. See ECE 456.

478. Information Theory
Same as ECE and STAT 463. See ECE 463.

479. Computational Complexity
Same as ECE and MATH 479. See ECE 479.

490. Individual Study
Individual study or reading in a subject not covered in normal course offerings. *Prerequisite:* Consent of instructor. ½ to 4 units. May be repeated.

491. Advanced Seminar in Computer Science
Seminar on topics of current interest. Subjects will be announced in the *Timetable*. *Prerequisite:* Consent of instructor. 0 to 1 unit. May be repeated in the same or subsequent semesters as topics vary.

497. Special Topics in Computer Science
Lecture course in topics of current interest. See *Timetable* for current topics. *Prerequisite:* Consent of instructor. ½ to 1 unit. May be repeated.

499. Thesis Research
Prerequisite: Consent of instructor. 0 to 4 units. May be repeated.

COPTIC

(See Classics)

CRAFTS

(See Art and Design, School of)

CROP SCIENCES

Head of Department: Gary H. Heichel
Department Office: AW-101 Turner Hall, 1102 South Goodwin Avenue, Urbana
Phone: 333-3420
URL: w3.aces.uiuc.edu/CropSci/

Includes Crop Sciences (CPSC) and Plant Pathology (PL PA)

Crop Sciences (CPSC)

100. Farming Systems
General introduction to the equipment and practices commonly used on Midwest farms. Classes will consist of short lectures followed by demonstrations. All classes and demonstrations will be conducted at the University of Illinois Crop Sciences Research and Education Center. Includes field trips to local production and agribusiness facilities. 2 hours.

120. Introduction to Applied Entomology
Same as ENTOM and NRES 120. Lectures, laboratory, and field trips cover the biology of insects and the recognition and management of insect pests of agricultural, forest, and urban ecosystems. Covers insect structure and physiology, classification, life histories, behavior, and pest management. 3 hours. Students may not receive credit for both ENTOM 120 and CPSC 120.

121. Principles of Field Crop Production and Protection
Introductory course on the kinds, origin, taxonomy, morphology, and physiological and ecological bases of growth, reproduction, improvement, and utilization of corn, soybeans, small grains, forage crops, and sorghum; cropping and tillage practices and principles; field-crop production hazards; basic principles of disease, insect and weed management in agronomic crops. 4 hours.

130. Medical Crops and Herbology
Same as NRES 130. See NRES 130.

140. Ecology of Agricultural and Forest Systems
Same as NRES 140. See NRES 140.

141. Introduction to Applied Statistics
Introduces fundamental statistics used to analyze and interpret data in the biological and physical sciences of agriculture, environmen-

tal sciences, and related areas. Includes descriptive and inferential statistics, measures of central tendency and dispersion, probability, correlation and regression, and tests of hypotheses. Enhances students' ability to critically assess statistical information encountered in professional and every day activities. 3 hours. Students may not receive credit for both CPSC 141 and STAT 100 or ACE 261.

150. The Global Food Production Web

Introduces students to the global web involved in the production of food we consume on a daily basis. Selected ecosystems of plants, people, and cultures in Asia, Africa, and Latin America will be studied based on involvement with various crops. Presents the origin and biology of plants; their evolution with humankind in various cultures; the spread and economic importance of crops around the world; and considers current hunger and environmental issues resulting from the global food web. Interactive communications with selected scientists, producers, and traders around the world through the World Wide Web and email system of the INTERNET permit students to get personal exposure to information and activities. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

205. Genetic Engineering Laboratory

Laboratory/discussion course that provides a hands-on introduction to the techniques and principles of genetic engineering, recombinant DNA and the impact of molecular genetics on society. Students will isolate DNA from plants and clone specific genes into bacterial plasmids, perform polymerase chain reactions, DNA restriction analysis and DNA blotting, and discuss the relevance of these techniques to both medicine and agriculture. *Prerequisite:* A general biology course. 3 hours.

220. Plant and Animal Genetics

Same as ANSCI and NRES 220. The principles of heredity in relation to plant and animal improvement. *Prerequisite:* PLBIO 100 or BIOL 104. 4 hours.

221. Biotechnology in Agriculture

Basic introduction to the techniques and application of biotechnology to a wide range of agricultural areas, and specific examples are given. May serve as either a terminal course explaining the techniques or as an introductory base for future studies. *Prerequisite:* Any 100-level course in a biosciences discipline. 3 hours.

226. Introduction to Weed Science

Same as NRES 227. Fundamentals of weed biology, ecology, and management. Emphasis is placed on basic principles and specific management strategies that are relevant to both crop and noncrop ecosystems. Includes a laboratory/discussion. *Prerequisite:* CPSC 121 or NRES 103 or PLBIO 100. 3 hours.

236. Tomorrow's Environment

Same as ENVST 236 and CHLTH 266. Introduction to interdisciplinary methods of analysis of environmental problems in a finite world; examination of the concept of the lim-

its to growth; development of a working understanding of natural systems and environmental economics; and examination of various management strategies (technical, economic, and social) that can be used to improve environmental quality. *Prerequisite:* One course in the life sciences and one course in the social sciences, or consent of instructor. 3 hours.

250. Crop Sciences Internship

Supervised off-campus learning experience with a business firm engaged in production or technological service to agriculture. *Prerequisite:* Sophomore standing; 2.0 GPA; CPSC 121 or NRES 101; and consent of program coordinator. 3 to 5 hours.

251. Research Experience in Crop Sciences

Supervised, on-campus, learning experience with faculty engaged in laboratory, greenhouse and/or field research in the plant sciences. *Prerequisite:* Sophomore standing, 3.0 GPA, consent of adviser, and consent of the Crop Sciences Teaching Coordinator. 1 to 4 hours. May be repeated to a maximum of 10 hours.

283. Introductory Ecology for Educators

Same as ENVST 283, and NRES 223. See NRES 223.

290. Undergraduate Crop Sciences Seminar

Course includes reports and discussions of crops and plant protection research. *Prerequisite:* Senior standing. 1 hour.

300. Advanced Special Problems

Individual problems in crops or plant protection. Graduate students majoring in agronomy do not receive graduate credit. *Prerequisite:* Minimum grade-point average of 2.5; not open to students on probation; consent of instructor. Approval of the crop sciences teaching coordinator is required prior to advance enrollment and registration. The honors section is open to James Scholars and other students having a minimum grade-point average of 3.0 and may be taken in conjunction with other courses in this department subject to approval of the instructor. 1 to 5 hours, or 1/4 to 2 units.

305. Plants and Global Change

Same as NRES and PLBIO 305. The science of global atmospheric and climate change in the 21st Century. Understanding of how plants, including crops, will respond and may be adapted to these changes. Using plants to ameliorate predicted climate change. *Prerequisite:* CPSC 121 or PLBIO 100. 3 hours or 3/4 unit.

308. Plant Tissue Culture

Same as NRES 308. See NRES 308.

310. Principles of Plant Protection

Principles of disease, insect, and weed management. Includes sampling methods, statistics, models and forecasting, thresholds, decision-making, cultural control, host plant resistance, biological control, the chemistry, regulation, environmental fate and impact of pesticides, transgenics, pest resistance to control. Provides students with an understanding of economically and environmentally

sound practices for integrated pest management. *Prerequisite:* Two of the following or consent of instructor: CPSC 120, 226 or PLPA 204. 4 hours or 1 unit.

315. Genetics of Higher Organisms

Contemporary advances in molecular genetics are integrated with classical genetic principles and concepts. Topics include linkage, recombination, restriction fragment length polymorphisms, allelism, gene interactions, and extranuclear inheritance. Examples are taken from higher organisms such as plants, animals and humans. *Prerequisite:* CPSC 220 or BIOL 210 or consent of instructor. 3 hours or 3/4 unit.

318. Crop Growth and Production

Crop production and management as influenced by environment, plant species, and cropping system; relates plant growth processes to management practices. *Prerequisite:* NRES 101 and CPSC 121 or equivalent, or consent of instructor. 3 hours or 3/4 unit.

320. Conservation Biology

Same as ENVST 320 and EEE 349. See EEE 349.

321. Biological Control of Insect Pests

Same as ENTOM 321. See ENTOM 321.

322. Forage Crops and Pastures

Forages, their plant characteristics, ecology, and production; grasslands of farm and range as related to animal production and soil conservation. *Prerequisite:* CPSC 121. 3 hours or 3/4 unit.

323. Principles of Plant Breeding

Same as NRES 323. Genetic and cytological variation in crop plants; the production and control of such variation in developing varieties and hybrids; and the maintenance of high quality seed stocks. Field trips; see *Timetable* for approximate cost. *Prerequisite:* PLBIO 100; CPSC 220 or equivalent. 4 hours or 1 unit.

324. Plant Breeding Methods

Discussion of the application of current scientific tools and methods available to plant breeders for improving plants; emphasis on actual use of plant breeding methods and production of high quality seed. Field trip; see *Timetable* for estimated cost. *Prerequisite:* CPSC 323. 2 hours or 1/2 unit. Offered summer only in alternate years.

326. Weed Management in Agronomic Crops

Principles of weed ecology and biology, and their application to weed management. Herbicides and their use in corn, soybeans and other agronomic crops. Specialized topics include weed management in reduced tillage, herbicide tolerant crops and management of problem weeds. *Prerequisite:* CPSC 226 or consent of instructor. 3 hours or 3/4 unit. Offered in alternate years.

329. Fundamentals of Insect Pest Management

Same as ENTOM 319. See ENTOM 319.

330. Plant Physiology

Same as PLBIO 330. See PLBIO 330.

331. Toxic Substances in the Environment
Same as ENVST 331 and CHLTH 361. See ENVST 331.

332. Genetic Toxicology
Same as ENVST and MCBIO 332. Introduces the field of genetic toxicology; includes the study of physical and chemical induced mutagenesis, survey of genetic indicator organisms and genetic assays, distribution of environmental mutagens and their biochemistry, analysis of case histories of environmental mutagens and risk assessment. *Prerequisite:* BIOL 210 or CPSC 220; CHEM 102; BIOCH 350, or 352 and 353, or consent of instructor. 3 hours or $\frac{3}{4}$ unit. Offered in alternate years.

333. Plant Physiology Laboratory
Same as PLBIO and NRES 333. See PLBIO 333.

336. Perennial Grass Ecosystems
Same as NRES 336. See NRES 336.

337. Ecology of Cropping Systems
Examines the dynamics and function of agricultural ecosystems and reviews fundamental concepts of ecology. Agricultural systems will be compared on the basis of energy flow, nutrient cycling, diversity, stability and required inputs. *Prerequisite:* CPSC 121 and PLBIO 100 or 102, and NRES 101, and either EEE 212, or NRES 316 or PLBIO 318; or consent of instructor. 3 hours or $\frac{3}{4}$ unit. Term papers required. Offered in alternate years.

340. Applied Statistical Methods
Same as AGE, ANSCI, FSHN, and NRES 340. Statistical methods involving relationships between populations and samples; collection, organization, and analysis of data; and techniques in testing hypotheses with an introduction to regression, correlation, and analysis of variance limited to the completely randomized design and the randomized complete-block design. *Prerequisite:* MATH 112, or equivalent. 4 hours or 1 unit.

349. Basic Toxicology
Same as ENVST and V B 349, and FSHN 380. See FSHN 380.

350. Crops and Society
Interpretations of the role of crop plants in the development of culture and civilizations. Crops are described primarily in terms of their origins, evolution and influence on social and political institutions. *Prerequisite:* A general biology course and a general chemistry or physical science course, or the consent of the instructor. 3 hours or $\frac{3}{4}$ unit.

360. Transmission Electron Microscope Optics and Operation
Same as V B 360. See V B 360.

361. Specimen Preparation for Transmission Electron Microscopy
Same as V B 361. See V B 361.

377. Diseases of Field Crops
Same as PL PA 377. See PL PA 377.

379. Advanced Soil Ecology
Same as NRES 379. See NRES 379.

400. Seminar
Current research in crops, genetic engineering, plant protection and other topics relevant to Crop Sciences. *Prerequisite:* Graduate standing. $\frac{1}{4}$ unit. May be repeated in separate semesters as topics vary to a maximum of $3\frac{1}{2}$ units. Students enrolling in discussion sections receive S/U grading. Students enrolling in lecture-discussion sections receive letter grading.

418. Crop Growth and Development
Study of the physiological processes involved in growth and development of crop plants and the interaction of physiological processes and the environment that influences productivity. *Prerequisite:* CPSC 318 or 330. 1 unit.

423. Molecular Cytogenetics
Genetic and cytogenetic basis for developing plant materials with specific cytogenetic features and the use of such materials in plant improvement. Consideration of the role of genome organization in plant adaptation. Introduction to cytogenetic laboratory techniques. *Prerequisite:* CPSC 220 and BIOCH 350, or consent of instructor. 1 unit.

424. Plant Biochemistry
Same as NRES and PLBIO 424. Enzymes and pathways involved in plant intermediary metabolism. Basic cell physiology, bioenergetics, and hormonal regulation of metabolism. *Prerequisite:* CPSC 330 and BIOCH 350. 1 unit. Offered in alternate years.

425. Membrane Transport and Mineral Nutrition in Plants
Same as NRES, and PLBIO 425. Consideration of biochemical mechanisms for solute movement across plant cell membranes as related to nutrient acquisition, assimilation, and partitioning. *Prerequisite:* CPSC 330; BIOCH 350 recommended. $\frac{3}{4}$ unit. Offered in alternate years.

426. Herbicide Behavior in Plants
Study of various chemicals used to inhibit plant growth, including their uptake, translocation, mode of action, metabolism and resistance mechanisms in plants; and the relationship of chemical structure to the environmental fate of herbicides. *Prerequisite:* CPSC 326 and 330. 1 unit. Offered in alternate years.

430. Molecular Marker Data Analyses
Statistical analyses and interpretation of molecular marker data including development of genetic maps, cluster analyses, quantitative trait loci analyses, and plant breeding applications of molecular marker data. *Prerequisite:* CPSC 340 or equivalent, and CPSC 323 or equivalent. An advanced statistics course (e.g. CPSC 440 or ANSCI 345 or equivalent) and familiarity with SAS recommended. $\frac{1}{2}$ unit. Offered during Summer Term 1 only.

435. Mineral Nutrition of Plants
Same as PLBIO 435. See PLBIO 435.

440. Design and Analysis of Biological Experiments
Statistical methods as tools for research. Principles of designing experiments and methods of analysis for various kinds of designs, experimental (completely randomized, random-

ized complete block, split plots, Latin square) and treatment (complete factorial); covariate analysis; aspects of multiple regression; use of SAS for all analyses. *Prerequisite:* CPSC 340 or equivalent. 1 unit.

441. Advanced Design and Analysis of Biological Experiments
Same as ANSCI 441. Design and analysis of complex experiments; considers combined, nonreplicated, confounded and fractional factorials, lattices, mixed models, multivariate, response surface, and quality control design in terms of their characteristics and usefulness in biological and physical experiments. Analysis of actual experimental data with SAS software will be emphasized. Examples are drawn from numerous disciplines. *Prerequisite:* CPSC 440 or equivalent. 1 unit. Offered in alternate years.

442. Environmental Plant Physiology
Same as PLBIO 442. See PLBIO 442.

444. Quantitative Aspects of Plant Breeding
Studies the theoretical bases for plant breeding procedures with special emphasis on the relationship between type and source of genetic variability, mode of reproduction, and effectiveness of different selection procedures. *Prerequisite:* CPSC 323 and 440, or equivalent. 1 unit. Offered in alternate years.

445. Tissue Culture and Biochemical Genetics of Higher Plants
Describes the practice and uses of plant tissue culture in modern plant biology including callus, suspension, protoplasts, anther, embryo and organ culture and their use for basic and applied studies such as propagation, mutant selection, gene amplification, somaclonal variation and transformation. The plant biochemical genetics aspects encompass mutagenesis, mutant selection, mutant characterization and the use of genetic transformation to alter plant biochemistry. The mutations characterized will include photosynthesis, dwarf, viviparous, lipid, seed traits, blue fluorescent and herbicide resistant. A laboratory of three hours per week outside of the regular class time will be arranged for carrying out experimentation predominately with plant tissue culture. *Prerequisite:* CPSC 220 and BIOCH 350; or equivalent. 1 unit. Offered in alternate years.

446. Plant Gene Regulation
Same as NRES 446. Current topics and literature on the function and regulation of higher plant genes. Topics of emphasis: transposable elements, their effect on gene expression and variation, and uses in tagging and isolating genes; the developmental, tissue specific, or environmental regulations of plant genes; the structure, synthesis, subcellular targeting, and regulation of major cereal and legume seed proteins; the use of genetic engineering to explore the regulation of plant genes or to alter traits of agricultural importance. *Prerequisite:* CPSC 220, BIOCH 350, or consent of instructor. 1 unit.

450. Recombinant DNA Technology**Laboratory**

Intensive instruction in the core methodologies of recombinant DNA technology. Students will generate and analyze recombinant DNA clones, using methods such as PCR; DNA isolation, restriction and ligation; electrophoresis; hybridization; DNA sequencing; computer-based sequence analysis. *Prerequisite:* CPSC 220 or BIOCH 350, or equivalent, and consent of instructor. $\frac{1}{2}$ unit. Offered Summer Term I.

490. Professionalism and Ethics in**Agricultural and Natural Resource Science**

Same as NRES 490. Topics related to professional activities of agricultural and natural resource scientists, including scientific writing and publishing, grantsmanship and money management, oral presentation skills, finding and keeping a job, and mentoring and teaching are discussed. Ethical dimensions of these areas are explored through case studies. $\frac{1}{2}$ unit.

493. Advanced Studies in Crop Sciences

Directed studies of selected problems or topics relevant to Crop Sciences. Study may be in one of the following fields: 1) Plant Breeding and Genetics; 2) Plant Molecular Biology; 3) Plant Physiology; 4) Crop Production and Ecology; 5) Biometrics; 6) Plant Pathology; 7) Entomology; and 8) Weed Science. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 2 units. May be repeated in the same or separate semesters as topics vary to a maximum of 2 units.

499. Thesis Research

Individual research under supervision of faculty. Required of all students working toward the Master of Sciences (thesis option) or Doctor of Philosophy in Crop Sciences. 0 to 4 units. May be repeated in separate semesters as topics vary to a maximum of 4 units.

Plant Pathology (PL PA)**100. Plants, Pathogens, and People**

Plant diseases and their impact on food supplies and human history are studied in lectures, demonstrations and discussions. Issues of food production and safety, pesticide use and human health, and the environment are considered. Includes the biology of pathogens that cause plant disease. *Prerequisite:* RHET 105 or equivalent. 3 hours. Designed for nonscience and science majors.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

204. Introductory Plant Pathology

Concepts relating to causal agents of representative plant diseases, symptoms and diagnosis, modes of infection and spread, effects of environment on disease development, and methods of control. 3 hours.

300. Special Problems

For students desiring to study specific problems not assigned in other courses. *Prerequisite:* For undergraduates only, a minimum grade-point average of 2.5; not open to students on probation; senior standing; consent

of instructor crop sciences teaching coordinator. Specific approval of the associate dean in advance of registration is required for a second and/or third special problems course. The honors section is open to James Scholars and other students having a minimum grade-point average of 3.0 and may be taken in conjunction with other courses in this department subject to approval of the instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

301. Biology and Ecology of Plant Pathogenic Fungi and Nematodes

Principles of the biology, ecology and pathogenesis of fungi and nematodes that cause plant diseases; morphology, classification, and histories of these pathogens. *Prerequisite:* PLBIO 100, MCBIO 100 and 101, CPSC 220 or equivalent or consent of instructor. A course in biochemistry is recommended. 4 hours or 1 unit.

302. Plant Pathogenic Fungi and Nematode Laboratory

Laboratory companion to PL PA 301. Identification, classification, and culturing techniques for plant pathogenic fungi and nematodes. *Prerequisite:* Concurrent or prior registration in PL PA 301. 1 hour or $\frac{1}{4}$ unit.

303. Viral and Bacterial Pathogens of Plants

Current knowledge of the structural, physiological, genetic, and molecular characteristics of viruses and bacteria that cause disease in plants. Emphasis on biological concepts of pathogenesis, mechanisms involved in the interactions of viruses and bacteria with plants, and responses of plants to these pathogens. *Prerequisite:* PLBIO 100, MCBIO 100 and 101, CPSC 220 or equivalent or consent of instructor. 4 hours or 1 unit. A course in biochemistry is recommended.

308. Plant Disease Diagnosis

Field and laboratory techniques in plant disease diagnosis and appraisal; identification of diseases of small grains, turf, corn, soybeans, forage crops, vegetables, fruit, forest and shade trees, and ornamentals, both on field trips and in laboratory exercises. *Prerequisite:* PL PA 204, or equivalent. 2 hours or $\frac{1}{2}$ unit.

325. Diseases of Ornamentals and Turfgrasses

Symptoms, diagnosis, causal agents, epidemiology and control of diseases of ornamental and turfgrass plants are studied in lectures, laboratories and discussions. *Prerequisite:* PL PA 204. 3 hours, or $\frac{3}{4}$ unit.

377. Diseases of Field Crops

Same as CPSC 377. Studies the symptoms of major field crop diseases, life histories of causal organisms, and methods of control. Lecture and laboratory. *Prerequisite:* PL PA 204 or 301. 3 hours or $\frac{3}{4}$ unit.

403. Plant Nematology

Comprehensive study of plant-feeding nematodes with emphasis on economically important groups; nematode morphology, identification, classification, developmental biology, ecology, and host-parasite relationships; interaction with fungi, bacteria, and viruses in plant disease development; experimental and diagnostic techniques; symptomatology and con-

trol. *Prerequisite:* PL PA 204 or 301; an introductory course in animal biology; or consent of instructor. 1 unit. Offered in alternate years.

406. Genetics of Plant-Pathogen Interactions

The genetics and expression of resistance in plants to fungi, bacteria, viruses, nematodes, and other pathogens; variation and genetic systems in pathogens with particular emphasis on pathogenicity; complementary genetic systems; and theory and practice of breeding disease-resistant plants. Lecture and discussion. *Prerequisite:* PL PA 204 or 301; and CPSC 323 or BIOL 122 or 210; or equivalent. 1 unit. Offered in alternate years.

408. Plant Disease Epidemiology

Fundamental concepts and principles of plant disease epidemics; includes pathometry, crop loss assessment, pathogen and host dynamics, quantification of pathosystem components, pathosystem management, disease forecasting, and decision analysis. *Prerequisite:* PL PA 204 or equivalent and CPSC 340 or equivalent. 1 unit. Offered in alternate years.

411. Molecular Biology of Microbe-Plant Interactions

Same as MCBIO 411. Detailed analysis of the microbe-plant interaction at the molecular level. Covers commensal, symbiotic, and pathogenic interactions from viewpoint of both plant and microbe. Emphasizes microbial and plant genes involved in the interactions, their organization, regulation of expression and the nature and function of the encoded gene products. *Prerequisite:* PL PA 303, or equivalent; MCBIO 316, or 330, or equivalent; and BIOCH 350 or equivalent. $\frac{3}{4}$ unit. Offered in alternate years.

472. Systematics of Ascomycetes and Fungi Imperfecti

Same as PLBIO 472. Identifies and classifies ascomycetes and fungi imperfecti emphasizing relationships between sexual and asexual forms; laboratory provides experience in collection, culturing and isolation, and identification. *Prerequisite:* PLBIO 372 or equivalent. $\frac{1}{2}$ unit. Offered in alternate years.

499. Thesis Research

Individual study and basic and/or applied research related to plant disease; required of all students working toward the Master of Science or Doctor of Philosophy in plant pathology. 0 to 4 units.

CURRICULUM AND INSTRUCTION

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Curriculum and Instruction (C & I)

101. Introduction to the Teaching of Secondary School Subjects

Survey of recent developments in the teaching of secondary school subjects; assesses standard and new programs; and explores research and empirical evidence as they relate to effective teaching of secondary school subjects. Special sections are provided in English, mathematics, science, social studies, speech, and computer science. Experiences in school settings are provided in C & I 219. 2 hours.

160. Serving Children in Schools and Communities

This service learning course is designed for students interest in working with children (defined as birth through high school), careers serving children, and/or parenthood. Three main topics implied by the title will be explored through reading, writing, and discussion: (1) The concept of "Serving"—an examination of what service means, as well as the kinds of service and satisfactions of service involving children. In this course, service includes not only volunteer service opportunities, but also careers related to serving children; (2) "Children"—a brief look at child development and a deeper analysis of social issues facing American children today; (3) "Schools and Communities"—an overview of institutions serving children, including families, schools, and community agencies. A minimum of two hours per week of approved community service related to children is a requirement of the course. Opportunities for service projects will be available in cooperation with the Office of Volunteer Programs. Students will be given an orientation to working with children in their service assignments. 2 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

219. Field Experience in Secondary Teaching

Offered in conjunction with C & I 101 in the secondary teacher education program in English, mathematics, science, social studies, speech, and computer science. Meets in subject area discussion sections one hour per week throughout the semester for purposes of assignment to schools, orientation to specific field experiences, and monitoring and evaluating these experiences. Students are assigned in a school for at least two hours per week for the entire semester. Students amass

at least 40 hours of early field experiences toward the required total of 100 hours. *Prerequisite:* Concurrent registration in C & I 101. 0 to 2 hours.

229. Field Experience in Secondary Education

Offered in conjunction with C & I 240 for students in secondary teacher education programs adopting this means of fulfilling early field experience requirements. Meets in discussion sections paralleling C & I 240 sections, for one hour per week throughout the semester, for purposes of assignment to schools, orientation to specific field experiences, and monitoring and evaluating these experiences. Students are assigned in school and community settings for at least two hours per week for the entire semester, thereby amassing at least 32 hours of early field experiences toward the required total of 100 hours. Registration is required in secondary teacher education programs adopting this means of fulfilling early field experience requirements. *Prerequisite:* Concurrent registration in C & I 240. 0 to 2 hours.

235. Content Area Applications of Educational Technology

Course will explore a wide range of educational technologies, investigating in detail those that can be effectively integrated into the full range of content areas in education. Course will cover the use of distributed information servers, multimedia collaborative network applications and other advanced instructional technologies to support learning and teaching. *Prerequisite:* E P S 201, EDPSY 236 or equivalent; or consent of instructor. 1 hour.

237. Theory and Process in Elementary School Teaching

Directed toward affecting prospective teacher insight with regard to classroom behavior in teaching; includes materials dealing with child learning, teaching theory, and elementary school curriculum. Eight-week morning assignment to a public school classroom is part of the course structure. *Prerequisite:* E P S 201, EDPSY 236, and admission to the Elementary Education Teacher Education curriculum. 5 hours.

239. Microteaching Practice in Teaching Techniques

Instruction and practice in basic teaching techniques; consideration of both teacher-centered and learner-centered techniques; systematic examination of each technique in terms of basic descriptive and evaluative procedures; and application of techniques to specific instructional situations. Students amass 32 hours of early field experiences (laboratory component) toward the required total of 100 hours. *Prerequisite:* Junior standing. 2 hours.

240. Secondary Education in the United States

Provides each specialized educational worker with a common orientation to the major responsibilities of the public school as a unit and to the educational worker's own specialized responsibilities and problems within the

framework of the total educational enterprise. Experiences in school settings, required in some curricula, are provided in C & I 229. *Prerequisite:* C & I 101; PSYCH 100; concurrent registration in E P S 201. 2 hours.

241. Techniques of Teaching in the Secondary Schools

Methods of teaching specific subject matter fields in the secondary school; special sections provided in the usual high school subjects. *Prerequisite:* E P S 201; C & I 240; concurrent registration in ED PR 242; consent of instructor. 3 to 5 hours.

249. Independent Study

Permits study of problems not considered in other courses; for students who excel in self-direction and intellectual curiosity. *Prerequisite:* Upperclassman; upper 5 percent of class in grade-point average; demonstrated writing competence, research potential, scholarly attitude, and interest as attested to by instructors; consent of adviser and staff member who supervises the work. 2 or 3 hours.

291. Thesis

Prerequisite: Senior standing. 2 hours.

292. Thesis

Prerequisite: Senior standing. 2 hours.

300. Workshop and Laboratory in Curriculum Development

Curriculum development projects in specialized fields of education. *Prerequisite:* Junior standing. 3 hours, or ½ or 1 unit. May be repeated to a maximum of 2 units toward any one degree.

301. Introduction to Teaching in a Diverse Society

Orients the student to ways in which English, Speech, Mathematics, Science, Social Studies is learned in middle school and senior high school settings. Integrates an introduction to the use of technology as both tool and a context for teaching and learning. As participants in a series of learning activities, students will reflect on the teaching and learning of English, Speech, Mathematics, Science, and Social Studies from an inquiry oriented perspective. Course work is integrated with field work to connect theory with practice in an examination of research and current trends in English, Speech, Mathematics, Science, and Social Studies education. *Prerequisite:* E P S 201, EDPSY 211 or equivalent, and admission to the professional education certification sequence. 3 hours or ¾ unit. May be repeated in separate semesters as topics vary to a maximum of 6 hours or 1 ½ units.

302. Teaching Diverse Middle Grade Students

Examines the curriculum and philosophy of teaching students in the middle grades. Students will focus on a number of related topics including teaching a diverse middle school student population, including all students in instruction, using technology for teaching middle school English, Speech, Mathematics, Science, and Social Studies and alternative means of assessing students' learning. Seminar content will be integrated with course work in adolescent development,

and special education in middle school settings. Course work is integrated with field assignments in working with middle school students. *Prerequisite:* C & I 301. 3 hours or ¾ unit. Requires concurrent enrollment in EDPSY 320 and SP ED 205.

303. Teaching Diverse Senior High School Students

Examines the curriculum and philosophy of teaching students in the senior high school grades. Students will focus on a number of related topics including teaching a diverse student population, including all students in instruction, using technology for teaching high school English, Speech, Mathematics, Science, and Social Studies and alternative means of assessing students' learning. Seminar content will be integrated with course work in instructional technology, assessment, and special education in senior high school students. *Prerequisite:* C & I 302. 3 hours or ¾ unit. Requires concurrent enrollment in EDPSY 391 and C & I 235.

304. Teaching and Assessing Secondary School Students

Emphasizes the practical application of theory and recommended practices for developing curriculum, teaching, and assessing learning in the middle and senior high school years. *Prerequisite:* C & I 303. 4 hours or 1 unit. Requires concurrent enrollment in SP ED 305, EOL 350, and ED PR 242.

305. Introduction to Teaching Elementary Age Children

Course examines the contexts of elementary education in the public schools. Includes content on teaching as a profession and community/family contexts of education. Course work is integrated with field experiences with elementary children. (ED PR 150). *Prerequisite:* E P S 201; EDPSY 236; or consent of instructor and admission to Elementary Education Teacher Education Curriculum. 1 hour or ¼ unit. Requires concurrent enrollment in ED PR 150.

306. Theory and Practice in Elementary School Teaching, I

Course examines teaching in the elementary grades. Students will focus on a number of related topics, including classroom management, instructional design, personal and professional attributes of effective teachers, and multicultural perspectives. Course work is integrated with field assignments in public elementary schools. *Prerequisite:* C & I 305, or consent of instructor. 4 hours or 1 unit.

307. Theory and Practice in Elementary School Teaching, II

Course continues the examination of teaching in the elementary grades, begun in C & I 305 and 306. In addition to continuing the study of some topics introduced in the previous courses, students will focus on the following topics as they complete student teaching: designing instruction for classes including special needs students, managing technology in the classroom, and working with parents. *Prerequisite:* C & I 306, or consent of instructor. 2 hours or ½ unit. Requires concurrent enrollment in ED PR 232.

320. Foundations of Early Childhood Education

Study of the role of the early childhood teacher in designing, organizing, and implementing educational programs for children in preschools, kindergartens, and the first three grades of the elementary school; includes the history, philosophy, and theory of early childhood education; includes morning school practicum providing at least 90 hours of early field experience. *Prerequisite:* Admission to the Early Childhood Teacher Education Curriculum; EDPSY 236; E P S 201. 5 hours or 1 unit.

321. Principles and Practices in Early Childhood Education

Studies the principles and practices of using play as an educational tool in early childhood education; reviews historical, philosophical, and psychological foundations of nursery-kindergarten methods; assesses techniques relating play to various aspects of instruction; surveys materials and equipment; and presents methods of classroom evaluation. *Prerequisite:* C & I 320. 3 hours, or ½ or 1 unit.

322. Parent Involvement Techniques for Teachers

Principles and practices in working with parents in programs of involvement, education, and participation for elementary and early childhood teachers; includes techniques of reporting to parents, counseling with parents, guiding parent participation in schools, and developing relations with community agencies. *Prerequisite:* C & I 320 or graduate standing. 3 hours, or ½ or 1 unit.

324. Pediatrics and Nutrition

Same as FSHN 305 and HDFS 305. See FSHN 305.

330. Principles and Practices in Mathematics Education

Organization, scope, and sequence of the mathematics program and the functional nature of mathematics; methods, techniques, experiences, and materials of value in teaching mathematics, and the role of classroom teacher. *Prerequisite:* C & I 237 or 320; MATH 201 or equivalent. 3 hours, or ½ or 1 unit. May be repeated in the same semester.

331. Teaching Elementary Mathematics

Examines the organization, scope, and sequence of the mathematics program and the functional nature of mathematics; methods, techniques, experiences, and materials of value in teaching mathematics, and the role of the classroom teacher. Includes laboratory experience, with supervised problem solving. *Prerequisite:* MATH 203, or consent of instructor and admission to Elementary Education Teacher Education Curriculum. 4 hours or 1 unit.

332. An Investigative Approach to Elementary Mathematics Instruction

Course will model and examine an investigative approach to elementary mathematics instruction, which is purposeful, inquire-based, and meaningful mathematics instruction, and which is integrated across math topics and with other content areas. *Prerequisite:* C & I 331, or consent of instructor. 2 hours or ½ unit.

335. Computer-Assisted Instruction

Same as C S 317. Computer-assisted instruction (CAI) and its relation to classroom teaching; the teacher's role in development, management, and criticism of CAI lessons; treatment of topics including instructional capabilities of CAI systems, instructional programming, and the design of CAI lessons. *Prerequisite:* A 100 level Computer Science course, or C S 400, or consent of instructor. 4 hours or 1 unit.

336. The Computer and Mathematics Education

Examines the role of the computer as an instructional tool in the secondary school mathematics classroom; reviews curricular materials and develops sample classroom projects in computer mathematics; analyzes computational problems and develops algorithms for their solution; and includes iteration, Monte Carlo methods, and simulation. *Prerequisite:* C S 101 or 400, or consent of instructor. 4 hours or 1 unit.

340. Principles and Practices in Science Education

The principles, place, and practice of science education in the school and in the lives of children; stresses the functional nature of science and its place in the curriculum; and considers the organization of the science program, experiences and techniques of value in teaching, and the role of the classroom teacher and specialist. Opportunity for experience in field and laboratory work. *Prerequisite:* C & I 237 or 320; two years of college science. 3 hours, or ½ or 1 unit.

342. Mathematics, Science, and Technology in Early Childhood Education

The principles, place and practice of science and mathematics education in early childhood education and in the lives of young children; stresses the functional nature of science and mathematics and their inter-relatedness; methods, techniques, experiences, and materials of value in teaching mathematics and science in early childhood education; and the role of the classroom teacher. Opportunity for experience in field and laboratory work. *Prerequisite:* Junior standing; C & I 320, general education requirements in mathematics (MATH 203 or equivalent), 2 years of college science. 5 hours or 1¼ units.

344. Social Studies in Early Childhood Education

Course emphasizes the place of social studies in early childhood education program (preschool-grade 3). Focuses on several areas of knowledge related to the social life of the community as it is concerned with young children; (1) knowledge from the social sciences, (2) social cognition and social skills learning, and (3) ways of dealing with cultural and social diversity. *Prerequisite:* Admission to the Early Childhood Program. 2 hours or ½ unit.

345. Principles and Practices in Social Studies Education

Emphasizes the role of social studies education in the school; the formal instructional program in social studies, including the knowledge, skills, and sensitivities to be

taught; the teaching strategies and materials employed; and the organization of learning experiences and the total program in addition to the educative impact of the school as a social system. *Prerequisite:* C & I 237 or 320; junior standing. 3 hours, or ½ or 1 unit.

346. Culture in the Classroom

Overview of the social and cultural factors that affect learning and teaching, and application of cultural information to curriculum development, classroom practices, and evaluation. 3 hours, or ½ or 1 unit.

347. Issues and Practices in Addressing Diversity in Elementary Education

Course examines multiple perspectives on and pedagogical responses to the historical diversity that has characterized United States education since its beginning. Course places particular emphasis on cultural issues, including the social construction and implication of race in contemporary society. Identity issues play a significant role as students examine the intersections of their biographies with those children in classrooms, especially in relation to classroom practices and the belief systems embodied in them. Developing concepts of racism (personal, cultural, and institutional) as well as of class and gender, are pivotal in response to agendas of privilege, equity, and justice. Culturally relevant practices are examined, as well as those developed in regard to differences in "ability" or in response to language and dialect differences. 1 hour or ¼ unit.

348. Teaching Elementary Social Studies

Course examines the nature and role of social studies in elementary schools, both in terms of the formal curriculum and of the impact of the school as a social system on children's social learning. Examine multiple approaches to what should be experienced and learned in social studies as well as the nature of social inquiry. Various instructional methods emphasizing direct experiences as well as reading are emphasized. Local, state, and national trends in curriculum and evaluation are addressed. Students engage in social inquiry, as well as develop, implement, and evaluate an action research project focusing in depth on a particular practice of social education. 3 hours or ¾ unit.

350. Teaching Elementary Science, I

Course is the first in a two-course sequence that examines science content, learning theory, and the teaching of science in the elementary school. Introductory course includes an introduction to children's learning in science and science content for elementary age children. *Prerequisite:* Admission to Elementary Education Teacher Education Curriculum. 2 hours or ½ unit.

351. Teaching Elementary Science, II

Course is the second in a two-course sequence that examines elementary science content, learning theory, and the teaching of science in the elementary school. Course includes an examination of the nature of science, as well as methods and materials for teaching science and assessing science learning. *Prerequisite:* C & I 350, or consent of instructor. 2 hours or ½ unit.

360. Principles and Practices in Language Arts Education

Goals, content, and teaching problems involved in the devising of programs in the area of language arts that are cumulative and sequential. *Prerequisite:* C & I 237 or 320. 3 hours, or ½ or 1 unit.

365. Language and Literacy in Early Childhood Education, I

Basic principles, techniques, and materials for the emergent literacy classroom. Emphasizes linguistic and cultural factors in culturally diverse settings. *Prerequisite:* EDPSY 236, admission to the Early Childhood Program. 3 hours or ½ unit.

366. Language and Literacy in Early Childhood Education, II

Emphasizes developmentally appropriate practices for the teaching of reading and writing in grades K-2. *Prerequisite:* C & I 365, admission to the Early Childhood Program. 2 hours or ½ unit.

367. Principles and Practices in Teaching Literature to Children and Youth

Examines literature written for children and youth and the uses of literature in the school curriculum. *Prerequisite:* C & I 237 and 320 and one college course in literature. 3 hours, or ½ or 1 unit. Students may not receive credit for both C & I 367 and LIS 303.

368. Children's Literature for Early Childhood Education

Examines literature written for children ages birth-eight years, extensive reading and analysis of literature in all genres and formats; evaluations of literature in relation to cognitive and linguistic development, emergent literacy, linguistic and cultural diversity, and family and school literacy; reviews and applies theories about the functions of literature. *Prerequisite:* One college literature course, or consent of instructor. 2 hours or ½ unit.

370. Principles and Practices in Reading Education

Basic principles, techniques, and materials for the developmental reading program; emphasizes methods and materials which provide for differentiated instruction. *Prerequisite:* Junior standing; C & I 237 or 320. 3 hours, or ½ or 1 unit.

371. Principles and Practices for Fostering Independence in Reading

Comprehension, study, and reference skills as they pertain to reading in the content fields; appropriate for elementary and junior high school majors, K-8. *Prerequisite:* C & I 370. 3 hours, or ½ or 1 unit.

372. Teaching of Reading in Grades Four Through Twelve

Developmental reading programs beyond the primary grades; factors related to reading speed and comprehension; vocabulary development, specific comprehension skills, study skills, and reading interests and tastes. *Prerequisite:* C & I 370 or EDPSY 211; junior standing. 3 hours, or ½ or 1 unit.

375. Teaching Elementary Reading and Language Arts, I

Course examines the basic theories, issues, methods, and materials for a developmental K-8 language arts program. Emphasizes language arts (including reading, as well as writing, speaking, and listening) as tools for learning across the curriculum. Addresses cultural diversity in language arts instruction, with emphasis on linguistic diversity. *Prerequisite:* C & I 367, or consent of instructor. 4 hours or 1 unit.

376. Teaching Elementary Reading and Language Arts, II

Course examines the basic theories, issues, methods, and materials for a developmental K-8 language arts program. Emphasizes language arts (including reading, as well as writing, speaking, and listening) as tools for learning across the curriculum. Addresses cultural diversity in language arts instruction, with emphasis on linguistic diversity. *Prerequisite:* C & I 367 and 375, or consent of instructor. 2 hours or ½ unit.

384. Instructional Technologies for Education and Training

Same as HRE 384. See HRE 384.

399. Issues and Developments in Education

Seminar course on topics not treated by regularly scheduled courses; requests for initiation may be made by students or faculty members. *Prerequisite:* Junior standing. 2 to 4 hours, or ½ to 1 unit. May be repeated to a maximum of 8 hours or 2 units.

400. Elementary School Classroom Programs

Explores organizational centers for determining selection and sequence of educative experiences in the elementary school classroom; emphasizes the role of the teacher in curriculum construction. 1 unit.

401. Fundamentals of Curriculum Development

Examines a variety of definitions of curriculum developments; readings reflect current theories and research related to substantive issues in the field: how learning is influenced by stated goals of education, cultural background of the learners, structure of the school setting, competencies of teachers, psychological characteristics of the learners, and means of measuring student achievement. 1 unit.

402. Continuing Education Program Development

Same as EOL and HRE 448. See EOL 448.

407. Problems and Trends in Specialized Fields

Intensive examination of problems and trends in the subject fields. 1 unit. May be repeated to a maximum of 2 units.

409. Curriculum Research

Reviews the principle methodologies used in research on curriculum problems; emphasizes subject-analytical, large-scale survey, experimental, case methods, and clinical studies; emphasizes the conceptual and practical prob-

lems in such research. *Prerequisite:* EDUC 400 or equivalent. 1 unit.

418. Evaluation of Educational Programs

Same as EDPSY 451. Origins, assumptions, applications, and development of approaches to educational program evaluation in practice over the past twenty years; unobtrusive measures and noneducation evaluation systems; and practice in collecting evaluative data. *Prerequisite:* EDPSY 390, one year of work with children or youth in an institutional setting, or consent of instructor. 1 unit.

419. Methods of Child Study

Studies ways in which teachers can evaluate child behavior and development with emphasis on classroom application; instruction and practice in the use and interpretation of observations, anecdotal records, rating scales, interviews, achievement tests, intelligence tests, questionnaires, and sociometric and projective techniques. *Prerequisite:* EDPSY 312 or consent of instructor. 1 unit.

420. Programs in Early Childhood Education

Advanced course intended primarily for teachers and supervisors of younger children, ages three to eight; reviews and analyzes research findings, experimentation, and current trends in curriculum organization, procedures, and materials essential to developing classroom programs for children. 1 unit.

421. Curriculum Problems and Trends in Early Childhood Education

Includes principles underlying education practices in day care centers, preschool/nursery and kindergarten settings derived from theory and research in developmental psychology, social psychology, anthropology, and other related disciplines. 1 unit.

422. Arts in Early Childhood: Curriculum in Context

Role of dance, drama, music, literature, and the visual arts in early childhood education, focusing on production/performance, appreciation, history, and aesthetics. Interrelationships among curriculum, notions of child development, cultural contexts, and unique traditions of different arts disciplines. Current art education practices in the United States and other countries. Requires attendance at performances and visits to an art museum. *Prerequisite:* Graduate status. ½ or 1 unit. One unit credit requires additional papers.

430. Trends and Issues in Mathematics Education

Deals with theories of learning, research studies, curriculum development projects, and other events which have influenced elementary mathematics programs; also considers problems and issues in contemporary programs. *Prerequisite:* C & I 400 or 420. 1 unit.

431. Development of Mathematics Programs

Deals with procedures for developing curricula in the major content areas of mathematics and alternative instructional procedures. *Prerequisite:* C & I 330 or equivalent; or consent of instructor. 1 unit.

435. Theory and Design of Instructional Simulations

Introduces theory and design of interactive simulations for teaching decision making in schooling/training situations; includes introduction to models of simulation, a process of simulation construction, identification and interpretation of learning outcomes, computer implementation of selected simulations. *Prerequisite:* C & I 335; C S 300 or equivalent. 1 unit.

440. Current Issues in Science Education

Advanced seminar in science education for teachers, consultants, and administrators. Identifies major problems and issues; analyzes current trends and research; and develops a philosophical framework related to science education. *Prerequisite:* C & I 340 or equivalent, and two years of college science; or consent of instructor. 1 unit.

449. Independent Study

Offers opportunity and challenge of self-directive, independent study; develops the individual's ability as an independent student, and enables the student to pursue needed study in a field in which appropriate courses are not being offered during a given semester. *Prerequisite:* Approval of study outline by adviser and the department chairperson prior to enrollment. ½ or 1 unit. May be repeated to a maximum of 2 units with consent of adviser and department head.

450. Methods of Educational Inquiry

Same as EDPSY and SP ED 450. Critical consideration of research concepts and methods used in alternative means of contemporary educational inquiry. 0 or 1 unit.

461. Theory and Practice in Children's Composition

Studies composition or writing, its beginning and progress, gives particular attention to the relationship between creativity and imagination and the basic skills of punctuation, spelling, and other conventions of writing; and examines research studies on functions of writing, motivation, and purposes for writing during the school years. *Prerequisite:* C & I 360 or equivalent. 1 unit.

462. Linguistics and the School Curriculum

Analyzes linguistics for the school curriculum including dialect diversities, new theories of grammar, lexicography, and variations in oral and written forms of language; gives attention to how teachers apply these principles in the construction or language arts programs. *Prerequisite:* C & I 360, or credit in a course in English grammar or linguistics. 1 unit.

463. Writing Studies I: Social Contexts and Functions of Writing

Same as SPCOM and ENGL 405. See SPCOM 405.

464. Writing Studies II: Writing Processes and Their Development

Same as SPCOM 406 and ENGL 464. See SPCOM 406.

465. Topics in Research, Inquiry, and Writing Studies

Same as ENGL 482. See ENGL 482.

466. Topics in Writing Pedagogy and Program Design

Same as ENGL 483. See ENGL 483.

467. Children's Literature and the School Curriculum

Investigates trends and issues related to teaching literature in the school; focuses attention upon the organization and planning of a balanced literature curriculum (fictional and informational). *Prerequisite:* C & I 367 or LIS 304; and ENGL 101, 103, 106, 115, 116, or consent of instructor. 1 unit.

468. Contemporary Classics in Children's Literature

Critically examines children's books that have received major national and international awards and prizes and the requirements for that distinction; gives particular attention to the most recent publications so honored and their implications for use in the classroom. *Prerequisite:* C & I 367 or 467, or LIS 304; and ENGL 106 or 215, or equivalent; or consent of instructor. 1 unit.

469. Topics in Discourse and Writing Studies

Same as ENGL 484. See ENGL 484.

470. Issues and Trends in Reading

The timing of beginning reading, the influence of certain linguists on methodology and terminology in instructional materials, and the influence of research on methodology are dealt with in a way that provides a historical perspective for evaluating the merit of emerging issues and trends. *Prerequisite:* C & I 370. 1 unit.

471. Field Instruction in Reading Programs

Directed practice in the area of reading; students are placed in an approved and supervised field position for part of the semester. 1 unit.

472. The Organization and Supervision of School Reading Programs

Studies procedures for planning, improving, and evaluating reading programs on a system-wide basis. Open only to those persons who are preparing to supervise reading programs or with approval of graduate adviser. *Prerequisite:* C & I 475. 1 unit.

473. Reading Instruction in Nursery School Through Grade Three

Planning and evaluating reading instruction and materials in nursery school through Grade Three. *Prerequisite:* C & I 370 or 371, or equivalent; or consent of instructor. 1 unit.

475. Corrective Reading Instruction in the Classroom

Nature, causes, and diagnosis of reading difficulties; translation of diagnostic information into instructional practice. *Prerequisite:* C & I 370 or 371, or equivalent. 1 unit.

476. Clinical Diagnosis and Remediation in Reading

Supervised experienced; special attention to evaluative and interpretative techniques in cases of severe reading disabilities based on the analysis of specific reading needs. *Prerequisite:* C & 1 475. 1 unit. May be repeated to a maximum of 2 units.

477. Clinical Practicum in Corrective Reading

Diagnostic procedures and individual instruction with small groups of children who have reading difficulties. *Prerequisite:* C & 1 475. 1 unit.

481. Aesthetics and Curriculum

Same as DANCE 481. Provides a synthesis of theoretical and autobiographical perspectives on aesthetic issues and their ramifications for the development and the critique of arts curricula. Drawing on Art as an important source of knowledge and communication, the course reviews ideas from Aesthetics and Arts Education (e.g., music, poetry, literature, visual arts, theater and dance education). Identifies principles common to all art forms but manifested differently in each of them to develop tools and skills for the design of, evaluation of, and research on arts curricula. *Prerequisite:* Graduate standing, and background with one of the arts, or consent of instructor. ½ or 1 unit.

490. Seminar for Advanced Students of Education

Prerequisite: Admission to doctoral study. 0 to 2 units.

491. Field Study and Thesis Seminar

Assists doctoral candidates in planning field studies and thesis problems. Students are expected to present their studies at each of four stages: (1) the inception, delimitation, tentative design stage; (2) the proposed design stage; (3) the revised design stage; and (4) the final design stage. Students are expected to analyze critically all presentations. *Prerequisite:* Admission to doctoral study. 1 to 2 units.

499. Thesis Research

Individual direction of research and thesis writing. 0 to 4 units.

CZECH

(See Slavic Languages and Literature)

DANCE

Head of Department: Patricia K. Knowles
Department Office: 907½ West Nevada Street, Urbana
Phone: 333-1010
URL: www.dance.uiuc.edu/dance

Dance (DANCE)**100. Introduction to Contemporary Dance**

Overview of major works, figures, and trends responsible for shaping dance as an evolving contemporary art form. The course will have lecture, viewing, discussion and experiential (studio participation) components. 3 hours. For nondance majors.

101. Beginning Modern Dance

Introduction to basic dance technique and movement improvisation; the study of motion as an art, group relationships in improvisation, and discussion of choreographic ideas. For nondance majors. 1 hour. May be repeated to a maximum of 4 hours.

102. Intermediate Modern Dance

Intermediate dance technique and improvisation. For nondance majors. *Prerequisite:* DANCE 101 or consent of instructor. 1 hour. May be repeated to a maximum of 4 hours.

105. Jazz

Introduction to basic dance technique and stylistic work in the jazz idiom. For nondance majors. 1 hour. May be repeated to a maximum of 4 hours.

106. Jazz Dance, II

Progressive development of the concepts and skills in DANCE 105. For nondance majors. *Prerequisite:* DANCE 105 or equivalent; or consent of instructor. 1 hour. May be repeated to a maximum of 4 hours.

107. Ballet Fundamentals, I

Introduction to ballet for nondance majors. 1 hour. May be repeated to a maximum of 4 hours.

108. Ballet Fundamentals, II

Progressive development of the concepts and skills in DANCE 107; for the nondance major. *Prerequisite:* Two semesters of DANCE 107 or equivalent; consent of instructor. 1 hour. May be repeated to a maximum of 4 hours.

109. Ballet Fundamentals, III

Intermediate level of Ballet technique for nondance majors. Course is a continuation and development of the skills in DANCE 108. *Prerequisite:* Two semesters of DANCE 108 or equivalent, and consent of instructor. 1 hour. May be repeated in separate semesters to a maximum of 4 hours.

120. Beginning Tap

Introduction to basic tap technique for nondance majors. Emphasis is on a concep-

tual understanding of tap style and the development of the specific skills needed for performance. 1 hour. May be repeated to a maximum of 4 hours.

121. Intermediate Tap

Intermediate level of tap dance technique for nondance majors. Course is a continuation of DANCE 120, emphasizing a progression in movement vocabulary, style, rhythm, and performance quality. *Prerequisite:* DANCE 120, or equivalent and consent of instructor. 1 hour. May be repeated to a maximum of 4 hours.

130. Performance Practicum, I

Performance laboratory involving the rehearsal and performance of student works under faculty supervision and/or works by faculty and visiting artists. *Prerequisite:* Consent of instructor, maximum of 16 hours of performance credit (DANCE 130, 330, 335) may be counted toward degree requirements. 1 to 3 hours (1 or 2 hours credit per dance).

131. Production Practicum

Practical experience in the production of dance concerts mounted in the Krannert Center for the Performing Arts. 1 or 2 hours. (1 hour credit per concert up to 2 hours per semester). May be repeated to a maximum of 6 hours.

150. Orientation to Dance

Survey of the field including dance as a theatre art, careers, injury prevention and nutrition. Also serves to orient incoming students to the faculty, programs, and policies of the Department of Dance, and the production and performing resources in the Krannert Center for the Performing Arts. *Prerequisite:* Major standing in Dance or consent of instructor. 2 hours.

151. Production in Dance

Examines the theoretical and practical aspects of dance production. Includes lighting, costumes, scenery, props, audio make-up, and some management. Commitment outside of scheduled class includes participation in the production of the annual Senior Concert. *Prerequisite:* DANCE 150. 2 hours.

160. Modern Technique, I

Elementary technique for majors with emphasis on a conceptual understanding of movement principles and the development of technical skill and performance sensitivity. *Prerequisite:* Departmental audition. 1 to 3 hours. May be repeated to a maximum of 18 hours.

162. Improvisation, I

Experience in selective, basic processes of movement involvement, both individual and group; special attention to organic, economical bodily use, the dynamics and quality of which are necessary to the activity being performed. 1 hour.

163. Improvisation, II

Continuation of DANCE 162, with emphasis on expanding bodily activity into various existing or created performing environments; use of sound and music, body coverings, and properties; and special attention to relating these experiences to dance composition. *Pre-*

requisite: DANCE 162 or consent of instructor. 1 hour.

164. Beginning Composition

Theory and practice in principles of dance composition; emphasis on solo creative work using various approaches to composition. *Prerequisite:* DANCE 163 or consent of instructor. 2 hours.

166. Ballet, I

Elementary ballet for dance majors; emphasizes placement, refinement of adagio, pirouette, jumps, and connecting steps. 1 or 2 hours. May be repeated to a maximum of 8 hours.

168. Music Theory for Dancers

Introduction to basic music theory with a concentration on rhythm. The first half of the semester will concentrate on 1) learning, understanding, and being conversant in basic music parameters; 2) analytical listening; 3) notation; 4) transcripts; 5) reading notation/ following a score; 6) performance of simple rhythm patterns. The second half will deal with form and formal analysis as it relates to choreography, as well as more advanced parameters of music theory. *Prerequisite:* Major standing in Dance. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated to a maximum of 9 hours.

210. Jazz Dance

Introduction to basic dance techniques and stylistic work in the jazz idiom for experienced dancers. Emphasis on a conceptual understanding of jazz style (as related to America's own cultural diversity) and the development of the specific skills necessary for performance and teaching. *Prerequisite:* Major standing in Dance, or consent of instructor. 1 hour. May be repeated to a maximum of 2 hours.

220. Tap Dance

Introduction to basic tap technique for experienced dancers. Emphasis on a conceptual understanding of tap style and the development of the specific skills necessary for performance and teaching. *Prerequisite:* Major standing in Dance, or consent of instructor. 1 hour. May be repeated to a maximum of 2 hours.

230. Dance Practicum

Provides dance majors with diverse performing experiences in the community. Venues will include area schools, nursing homes, and special populations. Students will participate in the creation of lecture-demonstrations which include improvisation and choreography. Participation in all performances is a requirement. Course is intended to be a two-semester experience with creation of the lecture-demonstration in the first semester and rehearsals/performances during the spring term. *Prerequisite:* Dance majors, or consent of instructor. 1 or 2 hours. Offered for 1 hour in fall, and 2 hours in spring. May be repeated in separate semesters to a maximum of 6 hours.

240. African-American Dance in American Culture

Same as AFRO 240. Overview of the development of African-American dance as a synthe-

sis of elements from several different cultures. Emphasis on the continuing impact of African-American dance on American culture. Course work will include both lecture-discussion and studio sessions. 3 hours.

260. Modern Technique, II

Progressive development of the concepts in DANCE 160, with emphasis on the qualitative and definitive performance of a variety of technical styles. *Prerequisite:* Admittance by departmental placement and consent of instructor. 1 to 3 hours. May be repeated to a maximum of 18 hours.

264. Intermediate Composition

Experience in choreographing a minimum of one solo and two small group works utilizing various approaches to choreographic form. *Prerequisite:* DANCE 164 or consent of instructor. 2 hours.

266. Ballet, II

Intermediate ballet for dance majors; a progressive development of movement concepts and vocabulary in DANCE 166, with emphasis on technical development and extended movement combinations. *Prerequisite:* Departmental placement and consent of instructor. 1 or 2 hours. May be repeated to a maximum of 8 hours.

269. Music Literature for Dancers

Basic analysis of representative pieces from the Renaissance, Baroque, Classical, Romantic, and Modern periods, emphasizing music of the twentieth century. Students learn to recognize general stylistic characteristics of each period and to understand dance forms related to the music. *Prerequisite:* DANCE 168 or equivalent, and consent of instructor. 3 hours.

295. Career Seminar

Addresses survival strategies and the transition from academe to the profession. Course content includes research and discussion of career possibilities in performance, choreography, teaching, community dance work, therapy, and the dance-related fields of health/fitness/recreation. Students will research individualized projects in an area of interest. *Prerequisite:* Senior standing in Dance. 1 hour.

298. Senior Project

The design, execution, and production of a culminating choreographic/performance project. *Prerequisite:* DANCE 365 and senior standing in Dance. 1 to 3 hours. May be repeated to a maximum of 3 hours of credit.

300. Viewing Dance

Overview of contemporary dance from the United States, Canada, and Europe focusing on the current works of significant emerging and established choreographers working in the field today. *Prerequisite:* For dance majors: undergraduate standing; DANCE 341, or consent of instructor. For nondance majors: junior, senior, graduate standing in the arts or consent of instructor. 1 hour or ¼ unit. Not open to MFA candidates in Dance.

301. The Alexander Technique for Dancers
Introduces the Alexander Technique: a practical method for changing habitual movement patterns which interfere with coordination, ease, and efficiency of movement. The course focuses on learning the principles through hands-on work, readings, discussions, and application to dance. 1-3 individual lessons outside of class required per semester. *Prerequisite:* DANCE 260 or consent of instructor. 1 hour or ¼ unit.

310. Advanced Jazz

Continuation of DANCE 210, emphasizing the conceptual understanding of the jazz style and development of specific skills necessary for this idiom. *Prerequisite:* DANCE 210 or equivalent and consent of instructor. 1 hour or ¼ unit. May be repeated in subsequent semesters to a maximum of 4 hours or 1 unit.

312. Theatre Dance, I

Same as THEAT 312. Stylistic characteristics of popular dancing beginning with the social dances, customs, and manners of early Renaissance and developing through 1850. Field trips may be required. *Prerequisite:* Junior standing in Dance or Theatre, or consent of instructor. 2 hours or ½ unit.

313. Theatre Dance, II

Same as THEAT 313. A continuation of DANCE 312. Focuses on the stylistic characteristics of popular dancing beginning with the social dances, customs, and manners, from 1850 and developing through Musical Theatre of the 20th Century. *Prerequisite:* Advanced standing in Dance or Theatre; DANCE 312 or equivalent, or consent of instructor. 2 hours or ½ unit. Field trips may be required.

314. Musical Theatre Choreography

Same as THEAT 315. Focuses on the study and practice of Musical Theatre Choreography. Includes choreographic experiences in the style of prominent musical theatre choreographers as well as choreography created by the students. *Prerequisite:* DANCE 313 or consent of instructor. 2 hours or ½ unit.

320. Dance Internship

Supervised field experience in community and/or professional organizations in a variety of danced-related areas. Provides students with work experience and exposure to professional situations. Written and/or video documentation and department presentation of internship activities required. *Prerequisite:* Consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated in separate semesters to a maximum of 6 hours or 1½ units.

328. Composer-Choreographer Workshop

Same as MUSIC 328. For experienced composers and choreographers; explores the many relationships between musical composition and choreography. *Prerequisite:* For dance majors, DANCE 264 or consent of instructor; for music majors, MUSIC 106 or equivalent, other compositional experience, and consent of instructor. 2 hours or ½ unit.

330. Performance Practicum, II

Laboratory for the rehearsal and performance of concert works by graduate choreographers,

faculty, and guest artists. *Prerequisite:* Consent of instructor. 1 to 4 hours, or ¼ to 1 unit (1 or 2 hours, or ¼ or ½ unit per dance). A maximum of 16 hours or 2 units of performance credit (DANCE 130, 330, 335) may be counted toward degree requirements.

331. Production Practicum

Practical experience in all aspects of the production of dance concerts mounted in the Krannert Center for the Performing Arts and on tour with the Illinois Dance Theatre. *Prerequisite:* DANCE 131 or equivalent, and consent of instructor. 1 or 2 hours, or ¼ or ½ unit (1 hour or ¼ unit credit per concert up to 2 hours or ½ unit per semester). May be repeated to a maximum of 6 hours or ½ unit.

335. Dance Repertory Workshop

Experience in learning, rehearsing, and perfecting concert dance pieces under the direction of experienced choreographers. *Prerequisite:* Enrollment in advanced technique course; consent of instructor. 1 or 2 hours, or ¼ or ½ unit. A maximum of 16 hours or 2 units of performance credit (DANCE 130, 330, 335) may be counted toward degree requirements.

340. History of Dance, I

Survey of Dance from its beginning in primitive societies through the early Nineteenth century. *Prerequisite:* Dance majors or consent of instructor; completion of campus Composition I general education requirement. 3 hours or 1 unit.

341. History of Dance, II

Survey tracing the development of dance from the rise of Romanticism through the twentieth century. *Prerequisite:* Consent of instructor. 3 hours or 1 unit.

345. Dance Kinesiology and Somatics

Introduction to human anatomy and kinesiology, specifically as applied to dance; introduction to the field of Somatics; approaches to improving the use of the body; exploration of the connections between the body, the mind, and movement. *Prerequisite:* Major standing in dance or consent of instructor. 4 hours or 1 unit.

347. Labanotation, I

Fundamentals of labanotation, including theory, reading, and writing; introduction to effort/shape analysis. *Prerequisite:* DANCE 260 or consent of instructor. 3 hours or 1 unit.

350. Teaching Workshop

Methods and approaches to the teaching of dance technique in the modern, ballet, and jazz idioms. The teaching of dance in community situations, K-6 and nursing homes, will also be addressed. *Prerequisite:* DANCE 260 and 266; junior standing in Dance or consent of the instructor. 3 hours or ¾ unit.

351. Independent Study and Special Topics
Special projects in research or creative investigation taught on an individual or class basis. *Prerequisite:* Junior standing and consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated for a maximum of 8 hours or 2 units, which may be counted toward degree requirements.

360. Modern Technique, III

Progressive development of the concepts in DANCE 260, with emphasis on virtuosity and versatility. *Prerequisite:* Admittance by departmental placement and consent of instructor. 1 to 3 hours, or ¼ or ½ unit. May be repeated to a maximum of 18 hours or 2 units.

365. Advanced Composition

Choreography for the experienced student; includes performance of at least one original work. *Prerequisite:* DANCE 264 or consent of instructor. 2 hours or ½ unit.

366. Ballet, III

Advanced ballet for dance majors; a progressive development of movement concepts and vocabulary in DANCE 266. For dancers of advanced technical level with the ability to execute the ballet vocabulary; includes fundamentals of pointe work. *Prerequisite:* Departmental placement and consent of instructor. 1 or 2 hours, or ¼ or ½ unit. May be repeated to a maximum of 8 hours or 1 unit.

367. Choreography for the Video Camera

Provides a comprehensive approach, from camera use to editing techniques, leading to a practical ability to develop and produce video projects on a basic level. Course focuses on developing choreographic projects designed specifically for the video/film format. *Prerequisite:* DANCE 164 and 264. 2 hours or ½ unit.

410. Professional Seminar

Survey of professional organizations, publications, scholarly resources, and trends, culminating in student presentation of projects examining current issues in the field. *Prerequisite:* Graduate standing in dance. ½ unit.

420. Problems in Teaching and Administration

Recent developments in the teaching of dance, including standards for major programs, curricula planning, performance experiences, administration, evaluation, and theoretical approaches to the teaching of studio courses. *Prerequisite:* DANCE 410. 1 unit.

430. Dance Touring Company

Repertory ensemble for the performance of lecture-demonstration programs, off-campus concerts, and short-term residencies; rehearsal and performance of works by resident faculty and guest choreographers. *Prerequisite:* Graduate standing in dance and audition. ½ unit. May be repeated to a maximum of 2 units.

431. Production Practicum

Practical experience in the technical, design, and administrative aspects of production in conjunction with department concerts. *Prerequisite:* Graduate standing in dance. ½ unit. May be repeated to a maximum of 1 unit.

441. Contemporary Directions in Dance

Critical approach to 20th century dance with emphasis on the evolution of ideas that have influenced and shaped the dance of today. *Prerequisite:* DANCE 340, 341 and graduate standing in dance; graduate students from other disciplines may be admitted with prerequisite courses and consent of instructor. 1 unit.

451. Supervised Teaching

Practical teaching experience under the supervision of a faculty member; weekly conference devoted to evaluation and planning. Teaching areas include major and nonmajor university courses and classes for community adults and children. *Prerequisite:* Graduate standing in dance. ½ to 1 unit. May be repeated to a maximum of 2 units with consent of instructor as topics vary.

460. Modern Technique, IV

Modern technique for advanced graduate students. *Prerequisite:* Graduate standing in dance and placement by technique faculty. ¼ to ¾ unit. May be repeated to a maximum of 4 units.

465. Choreography

Structured creative utilization of formal choreographic elements in the creation, rehearsal, staging, and performance of original dance works. *Prerequisite:* Graduate standing in dance and audition. ½ unit.

466. Ballet, IV

Ballet for advanced graduate students. *Prerequisite:* Graduate standing in dance and placement by technique faculty. ¼ to ¾ unit. May be repeated to a maximum of 4 units.

475. Production for Dance

Examines theoretical and practical aspects of dance production with emphasis on lighting and costuming; includes scenery and props, make-up, audio, video, stage management, and public relations. The design and execution of costumes for a dance production is a required culminating project. *Prerequisite:* MFA candidacy in Dance; DANCE 465; concurrent registration in DANCE 498. 1 unit.

481. Aesthetics and Curriculum

Same as C & I 481. See C & I 481.

498. Creative Project in Dance

The design, implementation, and completion of a culminating creative project in choreography and/or performance. *Prerequisite:* 7 units of graduate work in dance, including one unit in choreography. 1 unit. May be repeated to a maximum of 2 units.

EAST ASIAN LANGUAGES AND CULTURES

Head of Department: Ronald P. Toby
Department Office: 608 South Mathews Avenue,
Urbana
Phone: 244-1432
URL: www.ealc.uiuc.edu

Includes Asian Studies (AS ST), Chinese (CHIN), East Asian Languages and Cultures (EALC), Japanese (JAPAN), and Korean (KOREA)

Note: All 200-level language courses are open to freshmen and are taught in English.

Asian Studies (AS ST)

104. Asian Mythology

Same as RELST 104. See RELST 104.

186. Southeast Asian Civilizations

Same as ANTH 186 and HIST 172. See ANTH 186.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

290. Individual Study

Directed readings in the languages and literatures of South Asia, Southeast Asia, or the Near East. The area selected depends on the student's interest. *Prerequisite:* Consent of instructor. 2 to 4 hours.

291. Honors Tutorial

Tutorial in the civilizations of South Asia, Southeast Asia, or the Near East. The geographical area or nation and discipline depend on student interests. All students submit a substantial paper. *Prerequisite:* Completion of two honors activities, work in Asian studies, and consent of instructor. 2 to 4 hours. May be repeated to a maximum of 6 hours.

298. Colloquium in South, Southeast, and Southwest Asian Studies

Prerequisite: Junior standing. 3 hours. (Counts for advanced hours in L.A.S.)

338. Governments and Politics in the Near East

Same as POL S 338. See POL S 338.

345. Tutorials in East and Southeast Asian Languages

Tutorials at the elementary, intermediate, and advanced levels in Asian languages not regularly offered are available with the consent of the head of the Department of East Asian Languages and Cultures. *Prerequisite:* Consent of head of the Department of East Asian Languages and Cultures. Graduate credit is given only for work beyond the elementary level. 2 to 5 hours, or ½ to 1 unit. May be repeated up to 6 semesters successively, but no more than 4 units of graduate credit may be accumulated in any one language.

347. Governments and Politics of Southeast Asia

Same as POL S 347. See POL S 347.

349. Governments and Politics of South Asia

Same as POL S 349. See POL S 349.

360. Peoples and Cultures of Oceania

Same as ANTH 360. See ANTH 360.

386. Peoples and Cultures of Mainland Southeast Asia

Same as ANTH 386. See ANTH 386.

450. Seminar in South, Southeast, and Southwest Asian Studies

Seminar on selected Asian topics. *Prerequisite:* Consent of instructor. 1 unit. Topics will vary

with instructor; seminar may be repeated for a maximum of 3 units.

490. Individual Study and Research in Special Topics

Supervised individual investigation or study of a topic not covered by regular course offerings. The topic selected by the student and the proposed plan of study must be approved by the student's adviser and the instructor who supervises the work. *Prerequisite:* Consent of instructor. ½ to 3 units.

Chinese (CHIN)

101. Elementary Chinese, I

Introduction to Mandarin Chinese, including conversation with a native Chinese-speaking tutor under the direction of a linguist-instructor, and a minimum of formal grammar and writing. 5 hours.

102. Elementary Chinese, II

Second term of spoken Mandarin Chinese, including conversation with a native Chinese-speaking tutor under the direction of a linguist-instructor; formal grammar based on conversational materials; and work on written Chinese. *Prerequisite:* CHIN 101. 5 hours.

103. Intermediate Chinese, I

First term of second year of the Chinese language, including drill for more advanced conversational fluency; introduction to a greater variety of styles and levels of discourse and usage; and increasing study of the written language and more formal grammar. *Prerequisite:* CHIN 102, or equivalent. 5 hours.

104. Intermediate Chinese, II

Concentration on ability to engage in fluent discourse, on comprehensive grammatical knowledge, and on ability to read ordinary simple text in Chinese. *Prerequisite:* CHIN 103 or equivalent. 5 hours.

121. Elementary Spoken Mandarin, I

For nonmajors who want to develop a basic competence in spoken Mandarin Chinese. Emphasizes the development of pronunciation, vocabulary and grammar skills with a concurrent emphasis on mastery of Pinyin phonetic orthography. 4 hours. Credit is not given for both this course and CHIN 101 or 102.

122. Elementary Spoken Mandarin, II

Continuation of CHIN 121. Emphasizes development of pronunciation, vocabulary and grammar skills, with a concurrent emphasis on mastery of Pinyin phonetic orthography. *Prerequisite:* CHIN 121. 4 hours. Credit is not given for both this course and CHIN 101 or 102.

141. Chinese Reading and Writing

Students with a basic background in spoken Mandarin will develop their ability to read and write Chinese characters. Successful completion of CHIN 141 and 142 fulfills the Liberal Arts and Sciences foreign language requirement. *Prerequisite:* CHIN 122, or speaking proficiency as determined by placement test. 4 hours. Credit is not given for both this course and CHIN 101 or 102.

142. Chinese Reading and Writing

Continuation of CHIN 141. Successful completion of this course fulfills the Liberal Arts and Sciences foreign language requirement. *Prerequisite:* CHIN 141, or proficiency as determined by placement test. 4 hours. Credit is not given for both this course and CHIN 103 or 104.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

205. Advanced Chinese, I

Continuation of intermediate-level Chinese with emphasis on rapid reading, vocabulary acquisition, and newspaper reading. *Prerequisite:* CHIN 104 or 142. 5 hours.

206. Advanced Chinese, II

Continuation of CHIN 205 with emphasis on rapid reading, vocabulary acquisition, and newspaper reading. *Prerequisite:* CHIN 205. 5 hours.

299. Study Abroad

Lectures, seminars, and practical work in Chinese language, literature, and civilization and in other academic areas appropriate to the student's course of study. *Prerequisite:* Junior standing and a GPA of 2.5. 0–16 hours. May be repeated to a maximum of 32 hours per academic year.

307. Introduction to Literary Chinese

Introduction to literary language, style, and structural patterns as reflected in the Confucian classics and other literary, philosophical, and historical texts. *Prerequisite:* CHIN 102 or equivalent. 3 hours or 1 unit.

308. Readings in Literary Chinese

Readings in texts selected from the Confucian classics and other literary, philosophical, and historical texts. Attention is given to linguistic and intellectual patterns and to problems of translation. *Prerequisite:* CHIN 307 or equivalent. 3 hours or 1 unit.

309. Social Science Readings in Chinese

Reading and translation of selected Chinese texts in the social sciences with emphasis on specialized terminology and prose style. *Prerequisite:* Three years of modern Chinese. 3 hours or 1 unit. May be repeated to a maximum of 9 hours or 3 units.

340. Fourth-Year Chinese, I

Focus of this course is on reading and discussing modern and pre-modern Chinese literary selections in Chinese. Students continue to develop dictionary, literary and writing skills begun at the advanced (205–206) levels. *Prerequisite:* CHIN 206 or equivalent. 3 hours or 1 unit.

341. Fourth-year Chinese, II

Continuation of CHIN 340. *Prerequisite:* CHIN 340 or equivalent. 3 hours or 1 unit.

390. Readings in Chinese Literature

Guided readings in Chinese literature in the vernacular with regular individual conferences and a paper. *Prerequisite:* Reading knowledge of Chinese and consent of instructor. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

415. Premodern Fiction and Drama

Close readings and analysis of selected pre-20th century Chinese works written in the premodern vernacular language. *Prerequisite:* CHIN 308. 1 unit.

417. Studies in Literary Chinese Texts

Close reading and analysis of selected Chinese texts written in the Chinese literary language with emphasis on poetry and artistic prose. *Prerequisite:* CHIN 308. 1 unit.

East Asian Languages and Cultures (EALC)

120. Introduction to East Asian Art: China and Japan

Same as ARTHI 101. See ARTHI 101.

122. History of East Asian Religions

Same as RELST 122. See RELST 122.

132. Zen

Same as RELST 132. See RELST 132.

140. Chinese Civilization

Introduction to the historical development of Chinese civilization. Emphasis will be on broad themes and the connections among cultural values, social institutions, political structures, and contacts with outsiders. Visual and literary evidence will be stressed. 3 hours.

150. Introduction to Japanese Culture

Topical introduction to Japanese cultural and aesthetic life with attention to cultural and aesthetic patterns as they are reflected in literature, language, and the arts. 3 hours.

170. East Asian Civilizations: China, Japan, Korea

Same as HIST 170. See HIST 170.

175. Masterpieces of East Asian Literature

Same as C LIT 175. Study of major works in the literary traditions of China and Japan, including haiku, noh, *Tale of Genji*, kabuki, Tang poetry, *Dream of the Red Chamber*, Ming theater, and the colloquial tale. 3 hours. No knowledge of Chinese or Japanese language required.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

205. Japanese Literature in Translation, I

Same as C LIT 211. Survey of Japanese literature from earliest times to 1600; readings in prose, poetry, and drama in English translation. 3 hours.

206. Japanese Literature in Translation, II

Same as C LIT 212. Survey of Japanese literature from 1600 to recent times; readings in prose, poetry, and drama in English translation; and lectures and papers. 3 hours.

207. Classical Chinese Literature

Same as C LIT 207. Surveys Chinese literary works from the classical tradition (history, philosophy, poetry, literary criticism) with attention to intellectual and artistic values. 3 hours. No knowledge of Chinese is required.

208. Chinese Popular Literature

Surveys Chinese popular literary works written in the vernacular language (short story, novel, and drama), with attention to cultural and artistic values. 3 hours. No knowledge of Chinese is required.

218. Japanese Hero Types

Same as C LIT 218. Analysis of Japanese hero and heroine archetypes in comparison with their Western counterparts: from shaman ruler, Don Juan, samurai romantic, and feudal paragons to modern superfluous hero and self-destructive hollow man. Discussion with readings and films. 3 hours. No knowledge of Japanese required.

219. Women in Japanese Literature

Same as C LIT and W S 219. Critical study of Japanese women's history as represented in literature, emphasizing religio-social-literary significance, male views of women, female roles, and universal experience of growing up female. Readings and discussion. 3 hours. No knowledge of Japanese required.

222. Traditional China

Same as HIST 222. See HIST 222.

223. Modern China

Same as HIST 223. See HIST 223.

224. Chinese Thought from Confucius to Mao

Same as HIST and RELST 224. See HIST 224.

225. Gods and Man in Modern Japanese Drama

Same as C LIT and RELST 225. Approach to modern Japanese culture through drama. Special emphasis is given to the postwar period. Readings in English supplemented by films and videotapes. 3 hours. No knowledge of Japanese required.

261. Women in East Asia

Same as W S 261. Interdisciplinary inquiry into the cultural and social patterns that have shaped women's lives in China, Japan, and Korea. 3 hours.

262. Popular Culture in China and Japan

Introduction to the popular cultural traditions of China and Japan; examines popular morality, cosmology, religion, secret societies, the "way of the samurai," body and health (acupuncture, meditation, Zen, T'ai-chi chuan), aesthetics (poetry, painting, tea ceremony), and the world of the courtesan using a variety of documentary, fictional, and visual sources. 3 hours.

265. Contemporary Korean Society

Same as SOC 265. Introduces contemporary Korean society: the twentieth century struggle of Korea for an individual identity; the Korean road to modernization and its significance for the United States and the developing world. 3 hours.

267. History of Korea

Same as HIST 267. Historical examination of the Korean experience, from the earliest times to the present day: basic political, social, economic patterns; examination of the cultural and intellectual tradition; Korea's historical

role in Asia; the Korean colonial experience; Korea in the modern world. 3 hours.

270. Korean Literature in English

Historical survey of Korean literature. Class will read and discuss English translations of representative works of Korean poetry and fiction as well as critical studies. 3 hours.

281. Introduction to Chinese Culture and Society

Same as ANTH 281. See ANTH 281.

285. Premodern Japanese History

Same as HIST 285. See HIST 285.

286. Modern Japanese History

Same as HIST 286. See HIST 286.

287. Introduction to Buddhism

Same as RELST 287. See RELST 287.

290. Individual Study

Directed readings in the languages and literatures of East Asia. The area selected depends on the student's interest. *Prerequisite:* Consent of instructor. 2 to 4 hours.

291. Honors Tutorial

Tutorial in the civilizations of East Asia. The country and discipline depend on student interests. All students submit a substantial paper. *Prerequisite:* Consent of instructor. 2 to 4 hours. May be repeated to a maximum of 6 hours.

295. Topics in Asian Religions

Same as RELST 295. See RELST 295.

298. Colloquium in East Asian Languages and Cultures

Prerequisite: Junior standing. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

301. Chinese Art

Same as ARTHI 301. See ARTHI 301.

302. Japanese Art

Same as ARTHI 302. See ARTHI 302.

311. The Chinese Novel

Same as C LIT 311. Reading and analysis of representative pieces of Chinese fiction from the fourth century B.C. to 1900 with emphasis on the development of Chinese fiction, its place in the literary tradition, and its role in society. 3 hours or 1 unit. No knowledge of Chinese is required.

312. Modern Chinese Literature in Translation

Same as C LIT 312. Reading and analysis of representative selections from Chinese literature since the May 4 Movement, with special attention to the relationship between literature and ideology in twentieth-century China. 3 hours or 1 unit. No knowledge of Chinese is required.

313. Premodern Chinese Drama

Same as THEAT 314. Survey of Chinese drama from the 12th century through the early 20th century. Students will read major works of Chinese drama in English translation, as well as works on stagecraft, performance styles, the

social functions of drama and the social role of actors. Videotaped contemporary performances of traditional drama will be viewed. *3 hours or 1 unit.*

315. Modern Japanese Fiction in Translation

Same as C LIT 315. Critical study of selected 20th century writers with an emphasis on cultural background, world view, human relationships, aesthetic theories, Japanese and Western traditions, and universal literary issues. *Prerequisite:* Junior standing or consent of instructor. *3 hours, or ½ or 1 unit.* Requires no knowledge of Japanese; readings and films.

322. Classical Japanese Poetry

Surveys Japanese poetry from early times (7th c.) to the early modern period (19th c.), from *chōka* and *tanka*, through various linked verse forms, and up to *haiku*, which is practiced popularly even today. Topics include poetic technique, social context, and the presence of poetry in other literary kinds. Main texts are poetry collections and narratives in English translation. *Prerequisite:* EALC 175, 205, 206, or equivalent, or consent of instructor. *3 hours or ¾ unit.* Requires no knowledge of Japanese.

328. Japan at War and Peace

Same as C LIT 328. Examination of the changing ways the Japanese have imagined war and peace in the twentieth century as documented in novels, memoirs, essays, plays, films, journalism, and other works. *Prerequisite:* Junior standing or consent of instructor. *3 hours or ¾ unit.*

330. Introduction to East Asian Linguistics

Same as LING 330. See LING 330.

336. Japanese Syntax

Course aims to provide advanced students of Japanese with a basic knowledge of syntactic characteristics of Japanese. By reading some classic literature along with more current work, we critically examine the analyses of a particular syntactic phenomenon in Japanese. *Prerequisite:* Two years of modern Japanese language and LING 202 for undergraduate students; LING 300 or LING 330 for graduate students. *3 hours or 1 unit.* May be repeated in separate semesters to a maximum of 6 hours or 2 units.

337. Government and Politics of China

Same as POL S 337. See POL S 337.

348. Government and Politics of Japan

Same as POL S 348. See POL S 348.

366. Japanese Cinema

Same as CINE 366. See CINE 366.

376. Classical Chinese Thought

Same as HIST 376. Inquiry into the major schools of Chinese thought in the Classical Period through the Han (206 B.C.–A.D. 220): Confucianism, Taoism and Legalism. Topics such as the concept of history, military thought and logic will be covered. Readings are in English. *Prerequisite:* One 100 or 200 level course on Chinese culture or consent of instructor. *3 hours or 1 unit.*

380. Buddhist Meditation

Same as RELST 384. See RELST 384.

383. Self and Society in Japan

Same as ANTH 383. See ANTH 383.

384. Family, Gender, and Population in Contemporary China

Same as ANTH 384. See ANTH 384.

385. Chinese Foreign Policy

Same as POL S 389. See POL S 389.

390. China Under the Ch'ing Dynasty

Same as HIST 390. See HIST 390.

391. Early-Modern Japan: The Making of National Culture

Same as HIST 391. See HIST 391.

392. Twentieth-century Japan: Negotiating Modernity

Same as HIST 392. See HIST 392.

393. Social-Economic History of Modern China

Same as HIST 393. See HIST 393.

394. Twentieth-Century China

Same as HIST 394. See HIST 394.

400. Proseminar in East Asian Languages and Cultures

Interdisciplinary introduction for first-semester East Asian Languages and Cultures graduate students to Western-language writings on East Asia that have been important to modern scholarship on the region. The proseminar will cover the three cultures of the region in an interdisciplinary fashion, focusing on the methods of various disciplines in their treatment of East Asia. Method refers both to the kinds of materials studies, and the theory and tools used in research. *1 unit.*

401. Seminar in Chinese Art

Same as ARTHI 401. See ARTHI 401.

420. Ethnicity in China

Same as ANTH 420. See ANTH 420.

431. Seminar in Japanese Literature

Examination of Japanese literature from a variety of genres and historical periods designed to prepare advanced students for independent work in literary criticism and analysis. Texts in the vernacular are read and discussed from a variety of critical perspectives. Students produce a term paper based on current scholarship in the field of Japanese literary studies. *Prerequisite:* A reading knowledge of Japanese. *1 unit.* May be repeated in same or subsequent semesters as topics vary to a maximum of 3 units.

434. Research Seminar in Japanese History

Same as HIST 434. See HIST 434.

450. Seminar in East Asian Languages and Cultures

Seminar on selected topics. Topic varies with instructor. *Prerequisite:* Consent of instructor. *1 unit.* May be repeated to a maximum of 3 units.

460. East Asian Language Pedagogy

Course is for teachers of Japanese, Chinese, or Korean language who wish to improve their teaching skills and learn more about second and foreign language acquisition specific to the East Asian Language context. Besides reviewing research on language teaching methodology and curriculum development, students will observe each other conduct practice classes and analyze videotapes of class sessions. *Prerequisite:* Native or near-native fluency in Japanese, Chinese, or Korean. *1 unit.* Undergraduates enroll only with consent of instructor and the Graduate College.

474. Problems in Japanese History

Same as HIST 474. See HIST 474.

475. Problems in Japanese Society and Cultures

Introduction to social, cultural, and intellectual issues that have shaped modern Japan. A variety of methodologies are employed, including those of intellectual history, anthropology, and literary criticism. *Prerequisite:* A reading knowledge of Japanese or consent of instructor. *1 unit.* May be repeated in same or subsequent semesters as topics vary to a maximum of 3 units.

483. Problems in Chinese History

Same as HIST 483. See HIST 483.

490. Individual Study and Research in Special Topics

Supervised individual investigation or study of a topic not covered by regular course offerings. The topic selected by the student and the proposed plan of study must be approved by the adviser and the instructor. *Prerequisite:* Consent of instructor. *½ to 3 units.* May be repeated.

Japanese (JAPAN)

101. Elementary Japanese, I

Introduction to Japanese, including conversation with a native Japanese-speaking tutor under the direction of a linguist-instructor, and a minimum of formal grammar and writing. *5 hours.*

102. Elementary Japanese, II

Second term of spoken Japanese, including conversation with a native Japanese-speaking tutor under the direction of a linguist-instructor; formal grammar based on conversational materials; and work on written Japanese. *Prerequisite:* JAPAN 101. *5 hours.*

103. Intermediate Japanese, I

First term of second year of the Japanese language, including drill for more advanced conversational fluency; introduction to a greater variety of styles and levels of discourse and usage; and increasing study of the written language and more formal grammar. *Prerequisite:* JAPAN 102 or equivalent. *5 hours.*

104. Intermediate Japanese, II

Concentration on ability to engage in reasonably fluent discourse in Japanese, on comprehensive views of formal grammar, and on ability to read simple ordinary written Japanese. *Prerequisite:* JAPAN 103 or equivalent. *5 hours.*

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

205. Advanced Japanese, I
Readings in graded Japanese texts with oral practice designed to help students acquire the sophisticated vocabulary and grammatical structures of written Japanese. *Prerequisite:* JAPAN 104. 5 hours.

206. Advanced Japanese, II
Continuation of JAPAN 205. Readings in graded Japanese texts with oral practice designed to help students acquire the sophisticated vocabulary and grammatical structures of written Japanese. *Prerequisite:* JAPAN 205 or equivalent. 5 hours.

307. Introduction to Classical Japanese
Introduction to the grammar, morphology, vocabulary, and style of classical Japanese language as found in premodern Japanese literary and historical writings. *Prerequisite:* Three years of modern Japanese language or equivalent. 3 hours or $\frac{3}{4}$ unit.

308. Readings in Classical Japanese
Readings in texts in classical Japanese selected from historical and literary sources of the premodern period. Attention is given to grammatical, morphological, and stylistic features and to problems in translation. Introduction to reading of classical syllabaries and manuscript texts. *Prerequisite:* JAPAN 307. 3 hours or $\frac{3}{4}$ unit.

309. Social Science Readings in Japanese
Readings in Japanese social science materials, including articles from newspapers, periodicals, and learned journals. *Prerequisite:* JAPAN 206 or equivalent. 3 hours or 1 unit. May be repeated to a maximum of 9 hours or 3 units.

340. Fourth Year Japanese, I
Further developments of skills in sophisticated Japanese language use, including readings in authentic materials in a wide variety of writing styles, writing for formal occasions, and speaking appropriately according to the situation while using precise vocabulary in correct level of speech. *Prerequisite:* JAPAN 206 or equivalent. 3 hours or 1 unit.

341. Fourth Year Japanese, II
Continuation of JAPAN 340. Further developments of skills in sophisticated Japanese language use, including readings in authentic materials in a wide variety of writing styles, writing for formal occasions, and speaking appropriately according to the situation while using precise vocabulary in a correct level of speech. *Prerequisite:* JAPAN 340 or equivalent. 3 hours or 1 unit.

360. Teaching Japanese as a Second Language, I
Introduction to basic theory of Japanese pedagogy; teaching methods, and theory and practice of teaching Japanese grammar. 3 hours or 1 unit.

361. Teaching Japanese as a Second Language, II
Application of pedalinguistics of Japanese; theory and method of instructional exercise

development for teaching Japanese in practice teaching of Japanese in the classroom. *Prerequisite:* JAPAN 360 or equivalent. 3 hours or 1 unit.

390. Readings in Japanese Literature
Guided readings in Japanese literature in the vernacular with regular individual conferences and a paper. *Prerequisite:* Reading knowledge of Japanese and consent of instructor. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

399. Study Abroad
Lectures, seminars, and practical work in the Japanese language, literature, and civilization, and in other academic areas appropriate to the student's course of study. *Prerequisite:* Junior standing and a GPA of 2.50. 0 to 16 hours, or 0 units.

Korean (KOREA)

101. Elementary Korean, I
Introduction to Korean, including conversation with a native Korean-speaking tutor under the direction of a linguist-instructor, and a minimum of formal grammar and writing. 5 hours.

102. Elementary Korean, II
Second term of spoken Korean, including conversation with a native Korean-speaking tutor under the direction of linguist instructor; studies formal grammar based on conversational materials; and includes some work on written Korean. *Prerequisite:* KOREA 101. 5 hours.

103. Intermediate Korean, I
First term of second year of the Korean language, including drill for advanced conversational fluency; introduces a variety of styles and levels of discourse and usage; and increases study of the written language and formal grammar. *Prerequisite:* KOREA 102. 5 hours.

104. Intermediate Korean, II
Second term of second year of the Korean language including drill for more advanced conversational fluency; more variety of styles and levels of discourse and usage; more formal grammar and an introduction of basic Chinese characters. *Prerequisite:* KOREA 103. 5 hours.

205. Advanced Korean, I
Concentrates on the ability to engage in fluent discourse, on comprehensive grammatical knowledge, and on the ability to read ordinary texts in Korean, including some Chinese characters. *Prerequisite:* KOREA 104. 3 hours.

206. Advanced Korean, II
Continuation of KOREA 205; emphasizes rapid reading, fluent conversation, learned vocabulary and idiom acquisition, and reading of newspapers. *Prerequisite:* KOREA 205. 3 hours.

ECOLOGY, ETHOLOGY, AND EVOLUTION

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Ecology, Ethology, and Evolution (EEE)

105. Environmental Biology
Introduction to ecological principles in relation to understanding environmental problems; emphasizes impacts upon ecosystems by human activities such as air and water pollution, usage of pesticides and pest control measures, expansion of agriculture in tropics and arid regions, harvesting the oceans, and development of energy sources. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

203. Behavior of Domestic Animals
Same as ANSCI 203. See ANSCI 203.

212. Basic Ecology
Lecture, discussion, laboratory, and field course dealing with the relationships between organisms and their environment; introduction to physiological bases for adaptations, population dynamics, community organization, and the structure and function of ecosystems. *Prerequisite:* One year of biology or concurrent registration in BIOL 122. 5 hours. (Counts for advanced hours in L A S.)

232. Comparative Vertebrate Anatomy
Classification and comparative anatomy of vertebrates including functions and evolution of their organs and organ systems. Lecture and laboratory. *Prerequisite:* BIOL 122 or equivalent. 5 hours. (Counts for advanced hours in L A S.)

243. Natural History and Social Behavior of the Great Apes
Same as ANTH 243. See ANTH 243.

290. Special Topics
Supervised participation in research and scholarly activities in ecology, ethology, or evolution, usually as an assistant to the instructor. *Prerequisite:* Two years of life sciences and consent of instructor. 1 to 5 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

294. Individual Topics
Supervised independent investigation of individual topics in ecology, ethology, or evolution; requires a written report to instructor.

Prerequisite: Two years of life sciences and consent of instructor. 1 to 5 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

301. Introduction to Evolutionary Biology
Introduction to the evidence for evolution and the origin and types of genetic variation, stressing various modes of selection and modern observations and experiments illustrating the evolutionary process. *Prerequisite:* BIOL 122 or 210. 3 hours or ¾ unit. Credit is not given for both EEE 301 and BIOL 107.

302. Molecular Evolution
Introduction to evidence for evolutionary change at the molecular and cellular levels of organization; origin and changes in macromolecules, genes, cells, and their organelles emphasized. *Prerequisite:* BIOL 122 or 210. 3 hours or ¾ unit.

311. Evolutionary Ecology
Emphasizes the evolution of life-history strategies in plants and animals (reproductive rates, life cycles, sex ratios, breeding and mating systems) and the coevolution of animals and plants (pollination, dispersal, and herbivory). *Prerequisite:* EEE 212 or equivalent. 3 hours or ¾ unit. Offered in alternate years.

316. Ecological Parasitology
Same as VP 316. Ecological perspective on parasite-host associations and parasitic diseases of vertebrates. Parasite life cycles, and the major parasitic groups; protozoa, platyhelminthes, nematodes and arthropods will be covered. The relation of parasitism to other ecological associations such as predation and competition will be emphasized. *Prerequisite:* EEE 212 or consent of instructor. 3 hours or ¾ unit.

320. Invertebrate Zoology
Invertebrates; structure and development; application of biological principles; specific and comparative morphology of the invertebrates; and coordination of structure and function, origin, development, and life histories. Lecture and laboratory. *Prerequisite:* BIOL 122 or equivalent. 5 hours or 1 unit. Offered in alternate years.

332. The Evolution of Adaptive Systems
Evolutionary mechanisms underlying adaptations; emphasizes origin and subsequent modification of major complex systems; pertinent evidence considered from several disciplines, including population biology, developmental biology, structural analysis and paleobiology. *Prerequisite:* BIOL 122 or 210. 3 hours or ¾ unit.

335. Ornithology
Structure, function, ecology, behavior, and evolution of the birds of the world; laboratory devoted to anatomy and identification; and field studies devoted to identification and behavior of birds. Independent research project and two optional weekend field trips. *Prerequisite:* BIOL 122 or equivalent. 5 hours or 1 unit. Offered in alternate years.

336. Mammalogy
Classification, distribution, life history, evolution, and identification of mammals. Lecture, laboratory, and field work. *Prerequisite:* BIOL 122 or equivalent. 4 hours or 1 unit. Offered in alternate years.

337. Ichthyology
Classification, anatomy, ecology, behavior, distribution, and evolution of fishes of the world. Emphasis is on morphological, ecological, and behavioral diversification of fishes in a phylogenetic context. Laboratory devoted to anatomy and identification. Three scheduled field trips (1-3 days each). *Prerequisite:* BIOL 122 or equivalent, or consent of instructor. 4 hours or 1 unit.

338. Herpetology
Classification, diversity, structure, function, ecology, behavior and evolution of amphibians and reptiles. Laboratory devoted to anatomy and identification. One week-end field trip. *Prerequisite:* BIOL 122 or equivalent, or consent of instructor. 4 hours or 1 unit.

339. Field Vertebrate Natural History
Laboratory and field course. Intensive study of North American vertebrates with emphasis on vertebrates of Illinois; taxonomy, life histories, habitats, and feeding habits of all the common resident species. *Prerequisite:* BIOL 122 or equivalent. 4 hours or 1 unit.

342. Fish and Wildlife Ecology
Same as NRES 322. See NRES 322.

343. Limnology
Fresh water biology; study of the lake, pond, and river with emphasis on the physical environment as well as on the plants and animals which live in fresh water. Lectures, discussions, laboratory, and field work. *Prerequisite:* BIOL 122 or equivalent. 5 hours or 1 unit.

344. Introduction to Primate Morphology and Behavior
Same as ANTH 343. See ANTH 343.

345. Population and Community Ecology
Characteristics of populations and their evolution, population dynamics and regulation, and organization and structure of communities; lecture and field research projects. *Prerequisite:* EEE 212 or equivalent. A course in statistics is highly recommended. 5 hours or 1 unit. Offered in alternate years.

346. Animal Behavior
Same as ANSCI, ANTH and BIOL 346. Introductory course emphasizing how patterns of behavior promote survival, change through evolution, and are modified by the environment. *Prerequisite:* BIOL 122 or equivalent; or consent of instructor. 3 hours or ¾ unit.

349. Conservation Biology
Same as ENVST 320. Synthesis of conservation biology with an emphasis on the preservation of biological diversity and its evolutionary potential. Laboratory includes an introduction to the use of modern molecular techniques in conservation biology, computer simulation modeling, and field conservation problem

solving. *Prerequisite:* EEE 212 or consent of instructor. 4 hours or 1 unit.

350. Behavior-Genetic Analysis
Same as ANTH and PSYCH 342. See PSYCH 342.

353. Hormones and Behavior
Same as NEURO and PSYCH 343. See PSYCH 343.

359. Stream Ecology
Same as CEE 347. See CEE 347.

373. Statistical Ecology
Same as NRES 378. Study of methods used in the collection and analyses of ecological data. Emphasis on sampling, experimental design, multivariate techniques, exploratory analyses, and computer intensive applications such as exact tests and permutation procedures. Laboratory emphasis on analyses and interpretation of ecological data with statistical software. *Prerequisite:* One course in ecology such as EEE 212 including basic concepts in population and community ecology and one course in statistics such as BIOL 371 or CPSC 340 including basic concepts of sampling, hypothesis testing/inference, and techniques such as t-tests and ANOVA. 4 hours or 1 unit.

383. Advances in Ethology: Behavioral Ecology
In-depth examination of areas of current interest at the interface of behavior, ecology, and evolution; focuses on communication, foraging, and social behavior. *Prerequisite:* EEE 212 and 346, or consent of instructor. 3 hours or ¾ unit. Offered in alternate years.

443. Problems in Primate Behavior and Ecology
Same as ANTH 443. See ANTH 443.

444. Concepts in Ethology
Discussion, review, and critical analysis of general concepts and specific problems in behavior with new topics each semester. *Prerequisite:* EEE 346. ½ unit. May be repeated.

445. Seminar in Fish and Wildlife Ecology
Modern ecological principles and concepts to specific problems in fisheries and wildlife. *Prerequisite:* EEE 342 or 345, or equivalent. ½ unit. Offered in alternate years.

452. Concepts in Ecology
Discussion, review, and critical analysis of general concepts and specific problems in ecology with new topics each semester. *Prerequisite:* An advanced course in ecology or consent of instructor. ½ unit. May be repeated.

490. Individual Research
Individual topics in research conducted under the supervision of faculty members in the Department of Ecology, Ethology, and Evolution. *Prerequisite:* Consent of adviser. ½ to 3 units.

491. Topics in Population Biology
Lecture and discussion of problems in population biology, with a different topic each semester. *Prerequisite:* Consent of instructor. ½ unit. May be repeated to a maximum of 4 units.

ECONOMICS

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Economics (ECON)

101. Introduction to Economics

General survey of the operation of the economic system; emphasizes the determination of the level of national income, the pricing and allocation of products, and factors of production under existing conditions in the United States. This is an honors course limited to students currently enrolled in the Chancellor's Scholar Program. 4 hours. Students with credit in ECON 102 or 103 may receive 2 hours credit in ECON 101. Students with credit in both ECON 102 and 103 may not receive credit for ECON 101.

102. Microeconomic Principles

Introduction to the functions of individual decision-makers, both consumers and producers, within the larger economic system. Primary emphasis on the nature and functions of product markets, the theory of the firm under varying conditions of competition and monopoly, the study of resource markets, the distribution of income, and the role of government in prompting efficiency and equity in the economy. 3 hours. Students receiving credit for ACE 100 may not receive credit for ECON 102.

103. Macroeconomic Principles

Introduction to the theory of determination of total or aggregate income, employment, output, price levels, and the role of money in the economy. Primary emphasis on monetary and fiscal policy, inflation, unemployment, economic growth, and international economics. 3 hours. Students with credit in ECON 101 may receive 1 hour of credit in ECON 103.

109. Current Economic Problems

Economic analysis of specific economic problems dealing with poverty, economic development, international economics, and other contemporary issues. *Prerequisite:* Credit or concurrent registration in ECON 102 or 103. 1 hour.

172. Economic Statistics, I

Introduction to the modern theory and methodology of statistics in the areas of economics and business; topics include descriptive statistics, probability theory, sampling theory and methodology, sampling distributions, estimation, and hypothesis testing. *Prerequisite:* Credit or registration in MATH 134 or equivalent. 3 hours. Students may not receive credit for this course if they have received credit for a college-level introductory statistics course such as ECON

261; PSYCH 233, 234, or 235; SOC 185; or STAT 100.

173. Economic Statistics, II

Continuation of ECON 172. Emphasizes estimation and hypothesis testing for the linear statistical model; topics include contingency tables, goodness of fit, single and multiple regression, correlation, Bayesian decision theory, time series analysis, and index numbers. *Prerequisite:* ECON 172; MATH 134 or equivalent. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

210. Economics of the Environment

Same as ACE, ENVST, NRES, and U P 210. See ACE 210.

214. Introduction to Public Finance

General survey of the economics of the public sector at the federal, state, and local levels, including government expenditures, public budgeting, cost-benefit analysis, principles of taxation, tax reform, and intergovernmental fiscal relations. *Prerequisite:* ECON 102 or equivalent. 3 hours. Credit is not given for ECON 214 if the student has credit for ECON 314. Current or prospective economics majors are encouraged to take ECON 314.

236. American Economic History

Traces the course of growth and development of the economy from the colonial period to World War I; emphasizes conceptualization of key issues of the American experience and analysis of significant episodes and turning points. *Prerequisite:* ECON 102 and 103 or consent of instructor. 3 hours.

238. European Economic History

Economic structure and development of Europe since 1000 with respect to agriculture, industry, trade, technology, finance, and government; emphasis on those forces which contribute to the economic development of Europe and on the spread of these forces throughout the world. *Prerequisite:* ECON 102 and 103 or consent of instructor. 3 hours.

240. Labor Problems

Survey of the problems and analysis of U.S. labor markets and unions; topics include labor force participation, occupations, hours, wage determination, development and attributes of U. S. labor unions, and overview of collective bargaining and the effects of unions, unemployment, wages and inflation, and racial and sex discrimination; and selected current policy problems. *Prerequisite:* ECON 102 or equivalent. 3 hours. Current or prospective majors are encouraged to take ECON 341. Credit is not given for ECON 240 if student has credit for or is currently enrolled in ECON 341.

245. Women in the Labor Market

Same as W S 245. Changing role of women in the labor market and the economy; supply and demand for women: nature, extent, and legal remedies for sex discrimination in employment; "earnings gaps" and variable employment costs, men versus women; new role of multi-earner families; and comparative use of women as a professional resource. *Prerequisite:*

site: ECON 102 or equivalent. 3 hours. Credit is not given for ECON 245 if student has credit for or is enrolled in ECON 346.

255. Comparative Economic Systems

Analyzes the significant similarities and differences in the development, structure, and policies of capitalism, communism, and market socialism. *Prerequisite:* ECON 102 or equivalent. 3 hours.

273. Regression and Forecasting

Covers the methodology of multiple regression, particularly as it applies to time series data and forecasting; also examines the use of various exponential smoothing models, and autoregressive integrated moving average models in business forecasting. *Prerequisite:* ECON 173 or equivalent. 3 hours. (Counts for advanced hours in L A S.)

294. Senior Research

Research and readings course for students majoring in economics; may be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Cumulative grade-point average of 3.0 or honors in the junior year, or consent of instructor; senior standing. 2 to 4 hours. (Counts for advanced hours in L A S.)

295. Senior Research

Research and readings course for students majoring in economics; may be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Cumulative grade-point average of 3.0 or honors in the junior year; senior standing. 2 to 4 hours. (Counts for advanced hours in L A S.)

299. Undergraduate Open Seminar, II

Independent study course covering topics not treated by regular course offerings. Requests for activation of this course may be made by students or by faculty and should be directed to the head of the department. While credit toward graduation is normally granted for this course, credit toward satisfying specific college or departmental requirements is contingent upon approval by the appropriate college or departmental committee. *Prerequisite:* Junior or senior standing. ECON 101 or equivalent is recommended. 0 to 9 hours. May be repeated.

300. Intermediate Microeconomic Theory

Microeconomic analysis including value and distribution theory; analysis of the pricing of the factors of production integrated in a micro-general equilibrium context which builds towards explaining the resource allocation process. *Prerequisite:* ECON 102 or equivalent; MATH 125 and 134 or equivalent are recommended. 3 hours, or ½ or ¾ unit. Students may not receive graduate credit for both ECON 300 and ECON 422. Upon recommendation by the adviser and approval by the Department of Economics, a noneconomics major may receive up to ¾ unit. Graduate credit for both ECON 300 and 400 is given only upon recommendation of the student's adviser and approval by the Department of Economics.

301. Intermediate Macroeconomic Theory

The modern theory of the determination of the level and rate of growth of income, employment, output, and the price level; discusses alternate fiscal and monetary policies to facilitate full employment and economic growth. *Prerequisite:* ECON 102 and 103 or equivalent; MATH 125 and 134 or equivalent are recommended. 3 hours, or ½ or ¾ unit. Students may not receive credit for both ECON 301 and ECON 423. Upon recommendation by the adviser and approval by the Department of Economics, a noneconomics major may receive up to ¾ unit. Graduate credit for both ECON 301 and 401 is given only upon the recommendation of the student's adviser and approval by the Department of Economics.

303. Macroeconomic Policy

Analyzes current macroeconomic policy issues, problems, and techniques; discusses various policy techniques including monetary, fiscal, incomes, and exchange rate policies, and their effectiveness for treating inflation, unemployment, productivity, resource and exchange rate problems. Emphasizes current issues in the U.S. but includes some discussion of other developed economies. *Prerequisite:* ECON 301 or equivalent. 3 hours, or ½ or ¾ unit.

306. History of Economic Thought

The development of economics; the examination of contributions of individual writers and schools of thought as they influenced economic thought and national policy. *Prerequisite:* ECON 102 and 103 or equivalent. 3 hours or ½ unit.

313. Economics of Consumption

Same as ACE 374. See ACE 374.

314. Public Sector Economics

Economic analysis of government tax and expenditure policies; topics include public good and externality theory, public choice theory, income distribution, cost-benefit analysis, principles of taxation, tax incidence, economic effects and optimal structures of major taxes, and taxation in developing economies. *Prerequisite:* ECON 300 or consent of instructor; consent of instructor required for student with credit for ECON 214. 3 hours, or ½ or 1 unit.

315. The Economics of Poverty and Income Maintenance

Same as L I R 315. Analyzes the nature and causes of poverty with special emphasis on critical evaluation of programs to combat poverty in the United States. *Prerequisite:* ECON 102 and 103 or equivalent. 3 hours, or ½ or 1 unit.

328. International Economics

Introduction to the theory of international trade and finance with selected application to current problems of commercial policy, balance of payments adjustment, and the international monetary system. *Prerequisite:* ECON 300 or equivalent, or consent of instructor; ECON 301 is recommended. 3 hours, or ½ or 1 unit.

329. Contemporary Issues in the International Economy

Analysis in depth of selected current issues and policy problems of the international economy, including (but not restricted to) the following: new approaches to the theory of international trade, reform of the international monetary system, role of the General Agreement on Tariffs and Trade and the United Nations Conference on Trade and Development in expanding trade between developed and undeveloped economies, problems of stabilizing international commodity markets, and balance of payments problems of the United States and other selected countries. *Prerequisite:* ECON 328 or equivalent. 3 hours, or ½ or 1 unit.

339. The European Economies

Analyzes the theory, history, and policy issues in the economics of the European Community, including the customs union, common agricultural policy, single market, and economic and monetary union. Discusses the economic interests and concerns of the individual nation-states of Europe. Treats current economic issues of concern to both Europe and the United States. Computer literacy is expected. *Prerequisites:* Credit or current registration in ECON 300 and 301. 3 hours or 1 unit. Students may not receive credit for both ECON 339 or ECON/HIST 237 taken previously.

341. Economics of Labor Markets

Same as L I R 341. Studies the microeconomic determinants of labor demand and supply, economic effects of unions, and macroeconomic labor market problems. *Prerequisite:* ECON 300 or equivalent. 3 hours, or ½ or 1 unit.

343. Unions, Bargaining, and Public Policy

Analyzes the legal background and economic issues associated with unions and collective bargaining in the United States including theory of the labor movement; process of union wage determination; analysis of strikes; background, strategies, and principal issues in collective bargaining; and problems and policies of government intervention. *Prerequisite:* ECON 102 and 103 or equivalent. 3 hours, or ½ or 1 unit.

345. Economics of Human Resources

Same as L I R 345. Education and training in economic growth; labor force characteristics; occupational structure and future human resources requirements; job information networks; economics of discrimination and underutilization; national human resources policies and programs; and private industry and union human resources planning. *Prerequisite:* ECON 300 or equivalent. 3 hours, or ½ or 1 unit. Graduate credit is not given for both ECON 345 and 444.

346. Family Economics

Same as ACE 370. See ACE 370.

350. The Developing Economies

Analyzes the economic problems associated with newly developing nations; emphasizes their economic structures, their factor scarcities, and their programs for development. Not open for graduate credit to graduate candi-

dates in economics. *Prerequisite:* ECON 102 and 103 or equivalent. 3 hours, or ½ to 1 unit. Graduate credit is not given for both ECON 350 and ECON 450 or 451.

351. The Development of the Japanese Economy

Analyzes Japan's international trade, economic structure, standards of living, policy-making process, and future prospect; additional attention to U.S.-Japanese economic relations and Japan's role in Asia. *Prerequisite:* ECON 102 and 103 or consent of instructor. 3 hours, or ½ or 1 unit.

352. Economic Development in Latin America

Same as ACE 352. Studies economic activity and the processes of diversification and industrialization in Latin America, with comparative analysis of selected countries. *Prerequisite:* ECON 102 or 103 or consent of instructor. 3 hours, or ½ or 1 unit.

353. Economic Development in South and Southeast Asia

Same as ACE 353. See ACE 353.

354. Economic Development of Tropical Africa

Same as ACE 354. See ACE 354.

357. The Russian Economy

Analytical survey of Soviet economic development; structure and performance of the economy; problems of planning and control; the dismantling of the Soviet economy in the Commonwealth of Independent States; problems of transition to a market economy. *Prerequisite:* ECON 102 and 103 or consent of instructor. 3 hours, or ½ or 1 unit.

358. The Economy of China

Discusses changes in the patterns of production, exchange, and distribution in Communist China, with emphasis on their relation to social transformation; survey of Chinese economic history over the past century, dealing with the institutional background to and the structure of economic activities in China. *Prerequisite:* ECON 102 and 103 or consent of instructor. 3 hours, or ½ or 1 unit.

359. The Israeli Economy

Analyzes the economic structures, policies, and performance of modern Israel, emphasizing the pre-1948 Palestine economy; the development of the Histadrut, Kibbutz, and Moshav; the economic relations between Arab and Jewish populations; and the impact of post-1948 immigration on Israel's economic development. *Prerequisite:* ECON 102 and 103 or consent of instructor. 3 hours, or ½ to 1 unit.

361. Urban Economics

Same as FIN 386. Analyzes the urban economy. The theory of urban spatial structure; the theory of local public finance, pricing, and investment decisions in the urban public sector; and the application of cost-benefit analysis and user-charge pricing to such problems as housing, transportation, land-use control, and pollution. *Prerequisite:* ECON 102 or equivalent; ECON 300 is recommended. 3 hours, or ¾ or 1 unit.

367. Dynamic Simulation and Impact of Energy Scarcity

Same as GEOG 367. See GEOG 367.

370. Computer Simulation Studies in the Physical and Social Sciences

Same as MATSE 382, and CSE 372. See MATSE 382.

371. Introduction to Applied Econometrics

Application of economic theory and statistical inference in the estimation and analysis of economic relations and predicting the outcomes of economic variables. *Prerequisite:* ECON 173 or equivalent; ECON 300 or 301. 3 hours, or ½ to 1 unit.

372. Econometrics

Studies econometric models and methods used in estimation and hypothesis testing in economics. *Prerequisite:* MATH 134, ECON 173, and MATH 225 or 315. 3 hours, or ½ or 1 unit.

375. Mathematical Economics

Introduction to linear and nonlinear economic models; emphasizes the formulation and interpretation of modern economic theory and welfare economics. *Prerequisite:* MATH 125, 225, or 315; MATH 242 or equivalent; ECON 300. 3 hours, or ½ to 1 unit.

380. Industrial Competition and Monopoly

Analyzes the ways firms and markets are organized, how they interact, outcomes of various types of firm behavior and performance of markets, and causes and types of market failure. *Prerequisite:* ECON 300. 3 hours, or ½ or 1 unit.

381. Government Regulation of Economic Activity

Analysis of economic bases, policies, and consequences of government regulation of economic activity. Reasons for government intervention in market behavior, methods of government intervention, and outcomes are studied. *Prerequisite:* ECON 300 or consent of instructor. 3 hours, or ½ or 1 unit.

383. Health Economics

Economic analysis of the health care industry to explain the demand for and supply of medical care. Includes analysis of behavior of consumers, producers, and insurers; and public policies to regulate the industry and to provide services for the poor and elderly. *Prerequisite:* ECON 300 is recommended. 3 hours or 1 unit.

385. Economics of Innovation and Technology

Examines the economic factors shaping innovation and technical change since the industrial revolution with emphasis on the economic relationship between science and technology and the role of government in technical change. *Prerequisite:* ECON 102 or equivalent; ECON 300 or consent of instructor. 3 hours, or ½ or 1 unit.

388. Law and Economics

Applications of economic theory to problems and issues in both civil and criminal law and the effect of legal rules on the allocation of resources; includes property rights, liability

and negligence assignment, the use of administrative and common law to mitigate market failure, and the logic of private versus public law enforcement. *Prerequisite:* ECON 300 or equivalent. 3 hours, or ½ or 1 unit.

400. General Economic Theory

Emphasizes microeconomic theory; principal topics include a review of value and distribution theory, the theory of choice by households and firms, general microeconomic theory, and theoretical developments of current interest. *Prerequisite:* ECON 102 or equivalent. 1 unit. Students may not receive credit for both ECON 400 and 422. Graduate credit for both ECON 300 and 400 is given only upon recommendation of the student's adviser and approval by the Department of Economics.

401. General Economic Theory

Emphasis on macroeconomic theory; principal topics include a review of Keynesian macroeconomic theory, formal growth theory, and selected business cycle theory. *Prerequisite:* ECON 102 and 103 or equivalent. 1 unit. Students may not receive credit for both ECON 401 and 423. Graduate credit for both ECON 301 and 401 is given only upon recommendation of the student's adviser and approval by the Department of Economics.

402. Microeconomic Theory, I

Introduction to the models and methods of modern microeconomic theory, concentrating on individual and firm decision making and on industry equilibrium; brief treatment of general equilibrium theory and welfare analysis. Topics include: consumer utility and demand theory; production and cost functions; firm supply, input demand, and price behavior; competitive, monopolistic, and oligopolistic industry analysis; and distribution theory. *Prerequisite:* ECON 300 and 301, or equivalent; calculus. 1 unit.

403. Macroeconomic Theory, I

Development of modern macroeconomic theory, including national income accounts and their relation to input-output tables; classical, Keynesian, and monetarist aggregate models; behavior hypotheses of consumption, investment, and government; properties and the role of money and interest; foreign trade and investment; price rigidity, price flexibility, and employment; wage-price interaction and inflation; and ad hoc stabilization models. *Prerequisite:* ECON 300 and 301, or equivalent; calculus. 1 unit.

404. Microeconomic Theory, II

General market equilibrium theory and welfare economics; discusses the problems of existence, stability, efficiency, and equity of economic equilibrium; and introduces social choice and the special problems created by public goods, externalities, and uncertainty. *Prerequisite:* ECON 402. 1 unit.

405. Macroeconomic Theory, II

Development of modern macroeconomic theory, including disequilibrium theory, optimal short-term stabilization measures, and monetary, fiscal, incomes, and exchange rate policies; large-scale econometric models; linear and neoclassical growth models;

aggregate distribution theory; money, capital movements, trade, and growth; optimal growth models; and exhaustible resources and growth. *Prerequisite:* ECON 403. 1 unit.

410. Advanced Topics in Economic Theory, I

Study at an advanced level of one or more of the following possible topics: economics of externalities, advanced aggregate economic theory, theory of central planning, investment theory, consumer behavior theory, capital theory, welfare economics, inflation theory, income distribution theory, or other topics. *Prerequisite:* ECON 402 and 403, or consent of instructor. 1 unit. May be repeated.

411. Advanced Topics in Economic Theory, II

Study at an advanced level of one or more of the following possible topics: economics of externalities, advanced aggregate economic theory, theory of central planning, investment theory, consumer behavior theory, capital theory, welfare economics, inflation theory, income distribution theory, or other topics. *Prerequisite:* ECON 402 and 403, or consent of instructor. 1 unit. May be repeated.

413. Consumption Economics

Same as ACE 474. See ACE 474.

414. Public Goods Theory

In-depth analysis of the theory of public goods; includes public goods and externality theory, public choice, theory of cost-benefit analysis, optimal income redistribution, and fiscal federalism. *Prerequisite:* ECON 300 or equivalent. 1 unit.

415. Economics of Taxation

Theoretical and empirical analysis of the impact of taxation on the economic system; topics include tax equity and excess burden, incentive effects of taxation, tax incidence, structure of major types of taxes (income, consumption, and wealth), normative tax analysis, and taxation in developing economies. *Prerequisite:* ECON 300 or equivalent. 1 unit.

418. Economics of Education, Health, and Human Capital

Same as EOL 418. See as EOL 418.

420. Monetary Theory

Micro- and macroeconomic theories of the supply of and demand for money; money substitutes and their significance; review of current empirical research; money in closed economy, macroeconomic, and static general equilibrium models; and analysis of inflation and unemployment. *Prerequisite:* Consent of instructor. 1 unit.

421. The Theory of Monetary Policy

Monetarism and other current topics; stabilization policy; money in dynamic models; money in open economy macroeconomic models; and international aspects of monetary theory. *Prerequisite:* Consent of instructor. 1 unit.

422. Microeconomics for Business

Microeconomics for professional business students. Shows relevance of value and distribution theories for business managers. Includes demand and supply theory consumer choice, production and cost theory, industrial struc-

ture, and wage and capital theory. Intended for students in the Master of Business Administration program. *Prerequisite:* Enrollment is often restricted to students in specialized programs. *1 unit.* Students may not receive credit for both ECON 422 and 300 or 400.

423. Macroeconomics for Business

Development of short run macroeconomic models. Analysis of private sector behavior functions, and government policy alternatives. Extensions for open economy models and growth models. Intended for students in the Master of Business Administration program. *Prerequisite:* Enrollment is often restricted to students in specialized programs. *1 unit.* Students may not receive credit for both ECON 423 and 301 or 401.

427. Business International Economics

Provides the business student with a working knowledge of the principles of international economics, issues in the current international business environment, U. S. and international trade law, and current policy issues and debates. Considers the basic causes and consequences of international trade, the foreign exchange market and theory of exchange rate determination, the U. S. trade deficit, the international monetary system, and antidumping and countervailing duty law, copyright and patent infringement law, the General Agreement on tariffs and trade, the rudiments of strategic trade theory, and selected policy issues varying by year. *Prerequisite:* Familiarity with intermediate microeconomics at the level of ECON 300. *1 unit.*

428. International Trade Theory

Development and use of the neoclassical theory of international trade for the analysis of tariffs, customs, unions, and the effects of trade on the distribution of income and welfare; analysis and use of the relations between the balance of payments and national income to study the role of income changes combined with price changes in the balance of payments adjustment process. *Prerequisite:* ECON 300 and 301, or equivalent. *1 unit.*

429. International Financial Economics

Examines the balance of payments, exchange rate, capital flows and international monetary system; fiscal and monetary policy in open economies. *Prerequisite:* ECON 300 and 301, or equivalent. *1 unit.*

430. Topics in International Economics

Advanced topics in international economics drawn from history, application, and policy; subject matter varies. *Prerequisite:* ECON 428 and 429, or consent of instructor. *1 unit.* May not be repeated for credit.

436. American Economic History

Emphasizes, but is not limited to, the reading and criticism of current literature in American economic history; attempts to facilitate understanding of the use of economic analysis in interpreting events framed in historical context; includes British colonial policy, trade and tariffs, industrialization, technology, slavery and the southern economy, land policy, agriculture, transportation and internal

improvements, capital mobilization and financial organization, and the measurement of economic growth. *Prerequisite:* Graduate standing in economics or consent of instructor. *1 unit.*

437. General Economic History

Treatment of selected topics in the economic history of industrialized economies by applying economic theory and quantitative methods of analysis to historical problems; exploration of the implications for contemporary work in economics. *Prerequisite:* Graduate standing in economics or consent of instructor. *1 unit.*

438. Economic History of Europe

Major lines of development since 1450; comparative study of forces and institutions inimical or favorable to growth; and selected readings on organization of economic activity, role of governments and the entrepreneur, commercial policy, monetary systems, land tenure, process of capital formation, industrialization, etc. *Prerequisite:* Consent of instructor. *1 unit.*

440. Labor Economics

Same as L I R 440. Survey of recent trends in the labor force, of real and money earnings, and of the distribution of national income used as the basis for a critical economic analysis of contemporary English and American wage theory. *Prerequisite:* ECON 300 and 301. *1 unit.*

441. Labor Economics

Same as L I R 441. Economic issues and implications involved in hours of work, employment and unemployment, and trade union institutionalism (the impact of the trade union upon the basic institution of a free enterprise economy); emphasis in all cases on the development of appropriate public policy. *Prerequisite:* ECON 300 and 301. *1 unit.*

442. Collective Bargaining

Same as L I R 442. See L I R 442.

443. Workplace Dispute Resolution

Same as L I R 443 and LAW 361. See L I R 443.

447. Labor Union Organization and Administration

Same as L I R 447. See L I R 447.

450. The Economics of Development and Growth

Review and analysis of the theories and patterns of growth in developed and underdeveloped economies; consideration of the problems and methods of measuring growth; critical examination of the variables thought to be strategic in the growth process; and exploration of the policy implications of different theories. *Prerequisite:* ECON 300 and 301, or equivalent. *1 unit.*

451. The Developing Economies

Analyzes the newly developing economies, with emphasis on institutional factors affecting development and economic policy relating to development. *Prerequisite:* ECON 450. *1 unit.*

452. Computer-Based Models for Economic Policy Analysis

Discusses problems and methods of building social accounting matrices and computable general equilibrium (CGE) models; provides hands-on experience with CGE models with a series of PC-based exercises. The exercises demonstrate a number of techniques for constructing CGE models and show applications of these models to a variety of economic policy problems in developing countries such as food subsidies, international trade restrictions, foreign debt, and sectoral investment priorities. *Prerequisites:* ECON 400 and 401 or equivalent; MATH 120 and 132 or equivalent. *1 unit.*

455. Comparative Economic Systems

Comparative analysis of the structures and policies of market-directed and planned economies. *Prerequisite:* ECON 102 or equivalent. *1 unit.*

460. Urban Economics

Examines the microeconomic theory of urban land-use and spatial structure (static and dynamic models); analyzes externalities caused by traffic congestion; normative and positive analysis of the provision of local public goods; and public policy issues (i.e., slums and urban decline, pollution). *Prerequisite:* ECON 402. *1 unit.*

463. Natural Resource Economics

Same as ACE 410, ENVST and NRES 463. See ACE 410.

464. Environmental Economics: Theory and Applications

Same as ACE 411 and ENVST 464. Examines both theory and policy applications in the environmental area; selectively reviews the literature to provide a framework for understanding the relevant economic relationships and the criteria appropriate for policy assessment; emphasizes the characteristics of major environmental problems and policy choices; and considers the valuation of environmental amenities and the conflict between environmental quality and growth. *Prerequisite:* ECON 300 or consent of instructor. *1 unit.*

466. Quantitative Analysis for Economics

Studies topics in optimization: implicit function theorem, multipliers and Kuhn-Tucker conditions; topics in matrix algebra including characteristic roots and vectors, partitioned matrices, quadratic forms, special matrices; topics on difference and differential equations common in economic theory. *4 hours or 1 unit.*

467. Mathematical Economics, I: Statics

Studies quantitative techniques useful in economic analysis and decision making; mathematical programming; input-output analysis; point-set theory and game theory; existence, optimality, and stability conditions for static general equilibrium; and activity analysis, including welfare economics. *Prerequisite:* MATH 315; ECON 402 and 403, or equivalent. *1 unit.*

468. Mathematical Economics, II: Dynamics

Studies quantitative techniques useful in economic analysis and decision making; single

and systems of difference and differential equations; dynamic programming; Pontryagin maximum principle; interaction of multiplier and accelerator; von Neumann model; Turnpike theorem; growth models; and control systems. *Prerequisite:* MATH 315; ECON 402 and 403, or equivalent. 1 unit.

470. Economic Statistics

Classical statistics and regression analysis; descriptive statistics, probability and point and interval estimation; decision theory; variance analysis; and linear regression and least-squares estimates. *Prerequisite:* A course in statistics or consent of instructor. 1 unit.

471. Econometric Analysis

Part 1: The construction of econometric models; characteristics of models and choice of estimating methods; and estimates of parameters by various methods. Part 2: Bayesian statistics and decision theory. *Prerequisite:* ECON 470 or equivalent. 1 unit.

472. Applied Econometrics

Develops a general methodological basis for searching for quantitative economic knowledge; integrates and gives operational content to the topics of economic, statistical, and econometric theory. *Prerequisite:* ECON 471 or 476, or equivalent. 1 unit.

473. Time Series Analysis in Economics

Modern time series analysis techniques for handling economic data which arises in a happenstance fashion through time and their application to specific economic problems. *Prerequisite:* ECON 471 or STAT 478, or equivalent. 1 unit.

476. Econometrics, I

Estimation of parameters for single-equation models; tests of hypotheses and confidence regions for regression models; large-sample theory in single-equation models; and Bayesian statistics in regression models. *Prerequisite:* MATH 315 and STAT 310. 1 unit.

477. Econometrics, II

Considers the specification of models with systems of simultaneous equations; identification problem, distributed lag models, K-class estimators, maximum likelihood estimators, three-stage least-squares, and effects of specification errors. *Prerequisite:* ECON 476. 1 unit.

478. Bayesian Inference in Econometrics

Examines some standard econometric problems from the Bayesian perspective and compares Bayesian and classical inference. *Prerequisite:* ECON 476 or equivalent. 1 unit.

480. Industrial Organization

Theory of the organization of markets and firms, behavior of firms, functioning of competitive systems, and performance of markets. 1 unit.

481. Anti-Trust and Business Policy

Economic analysis of public policy for market structure and conduct; topics include anti-trust and mergers, predatory pricing, advertising, and technological advance. *Prerequisite:* ECON 480. 1 unit.

482. Government Regulation of Industry

Microeconomic and econometric analyses of market failure and government response in selected industries; topics include economic effect of regulation, bureaucratic behavior, optimal policy, and strategies for regulatory reform. *Prerequisite:* ECON 402; ECON 480; or consent of instructor. 1 unit.

490. Individual Study and Research

Directed reading and research. 0 to 1 unit.

491. Workshop and Research Seminar

Workshops are offered in all areas of specialization in which graduate students are writing Ph.D. dissertations. The specific format varies, but in general workshop sessions include presentations by graduate students of thesis research, by faculty members of their current research, and by occasional outside speakers. *Prerequisite:* Admission to the Department of Economics Ph.D. program. ½ unit. A minimum of 1 unit of ECON 491 is required of all students in the Ph.D. program.

499. Thesis Research

Preparation of thesis required of all students writing master's or doctoral theses in economics. 0 to 4 units.

EDUCATIONAL ORGANIZATION AND LEADERSHIP

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URL: www.ed.uiuc.edu/EOL

Educational Organization and Leadership (EOL)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated in the same or separate semesters as topics vary.

267. The American College

Survey of the American college and university; its history, structures, problems, trends, and governance. Provides an opportunity to explore the nature and scope of higher education in the United States. 3 hours.

350. Legal and Professional Issues for Teachers

Provides the basic common understanding of schools as social organizations and the professional role of teachers in public schools; analyzes selected legal issues relating to student rights, employment and teacher rights, and collective bargaining in schools; and serves as an introduction to instructional supervision, teacher evaluation, and continuing professional development of teachers. *Prerequisite:* Admission into a teacher preparation program. 1 hour or ¼ unit. Concurrent enrollment in ED PR 232 or 242.

380. Continuing Education General Seminar

Introductory analysis of literature and professional practice in continuing education of adults; for beginning graduate students majoring in continuing education and for nonmajors. 2 or 4 hours, or ½ or 1 unit. May be repeated to a maximum of 8 hours or 2 units.

418. Economics of Education, Health, and Human Capital

Same as ECON 418. Basic economic analysis of human capital and the value of human time, with applications to the economics of education and health; theory and analysis of consumer investment in human and physical capital over the life cycle; the returns to education and health, and their effects on growth; the theory of nonmarket time; public finance of education and health; and implications for the analysis of the distribution of income. *Prerequisite:* A course in microeconomic theory and a course in statistics, or consent of instructor. 1 unit.

433. Clinical Supervision of Instruction

Same as C & I 416. See C & I 416.

438. Instructional Supervision

Methods, theories, and research applying to the supervision and evaluation of classroom instruction; includes analysis and application of research in effective teaching practices, formative and summative evaluation, staff development, data collection techniques, and alternative feedback methods. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

442. The Community College

Same as HRE 442. Community colleges and vocational-technical institutes: their purposes, function, and objectives; social forces related to their development and evaluation; characteristics and needs of students; educational programs and teaching strategies; and organization, control, and financing. 1 unit.

443. The College Student

Study of the characteristics and development of college students, the institutional contexts in which they operate, and the interaction of students with the college environment. 1 unit.

448. Continuing Education Program Development

Same as C & I 402 and HRE 448. Analysis of the process of planning and conducting continuing education programs for adults; includes theory, research, and practice regarding sponsors, need appraisal, objectives, selection and organization of learning activities, and evaluation. Recommended for majors in continuing education. *Prerequisite:* Consent of instructor; EDPSY 362 is recommended, especially for majors in continuing education. 1 unit.

449. Independent Study

Offers opportunity and challenge of self-directive, independent study, that is, develops the individual's ability as an independent student, and enables the student to pursue needed study in a field in which appropriate courses are not being offered during a given

semester. *Prerequisite:* Approval of study outline by adviser and the department head prior to enrollment. $\frac{1}{2}$ to 1 unit. May be repeated for credit with consent of adviser and department head.

450. Public Control and Administration of Education

Provides the basic common understanding of theory and practice in operation and control of schools useful to teachers and other citizens; analyzes both formal and informal influences on governance; and serves as an introductory course for prospective administrative officers and supervisors. 1 unit. Not open to experienced administrators nor to students who have taken any of the following (or equivalents): EOL 455, 461, 463, 465, 466, or 467.

452. Current Issues in Higher Education

Seminar on current issues, problems, and trends in higher education. *Prerequisite:* Two units in higher education or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

455. The Principalship in Elementary and Secondary Education

Provides an overview and analysis of the administrative, supervisory, and leadership functions of building-level administrators; emphasizes the design and implementation of effective educational programs on a school-wide basis; analyzes administrative tasks and processes through case studies, interviews with practitioners, simulations, and readings. *Prerequisite:* EOL 450 and teaching experience required. 1 unit.

461. School Improvement

Study of major ideas on school improvement, past and present, and of emerging research on the condition of public education in the United States. In-depth examination of reform proposals for changing the organization of schools, the instructional program, and the roles of students, teachers, and school administrators. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

463. Organizational Theory and Administrative Leadership

Study of theoretical perspectives and empirical research drawn from the social sciences relating to educational organizations and administrative leadership with an emphasis on application of theory to practice. *Prerequisite:* EOL 450 or consent of instructor. 1 unit.

464. Directed Field Experience in Administration

Direct experience in the study of educational problems of concern to administrators; features an action component whereby the student is provided with opportunities for assuming responsibility for decision making in a live or simulated setting; each student works under the supervision of a professor, and where possible and appropriate, a practicing administrator. 1 to 3 units. May be repeated to a maximum of 3 units, with no more than 1 unit earned at the master's level.

465. Personnel Administration

Principles, problems, and trends in the administration of professional public school person-

nel; organization of personnel; the legal framework of the personnel function; selection, evaluation and development of staff; collective bargaining, contract administration and personnel policy; and the personnel administrator's role as a catalyst for school improvement. *Prerequisite:* EOL 469 or equivalent or consent of instructor. 1 unit.

466. Public School Finance

Advanced graduate study of financing public education systems in the United States; focuses on the social, economic, political, legal, and technical dimensions of developing school finance policy for federal, state, and local governments; relates theory and research in public school finance to administrative practice in budgeting and financial administration. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

467. Public School Financial Administration

Role of financial administration in public schools; analysis of the budgetary and accounting systems used in American public education agencies; examination of the principles of school fiscal administration, including organizing the fiscal function and intergovernmental fiscal relations; emphasizes the role of financial decision making in public school administration. *Prerequisite:* EOL 466 or consent of instructor. 1 unit.

468. The Political and Social Context of Schooling

The political and social environment of public education in the United States; analysis of the power structure and its influence on educational policy making at the district level; examination of the evolving roles of state and federal agencies, the courts, private organizations, and interest groups in school governance. Studies the tension between the ideal of a democratically controlled public school system and the growing power of educational experts. *Prerequisite:* An undergraduate course in political science, or an introductory course in the politics of education such as EPS 309, or consent of instructor. 1 unit.

469. Legal Basis of Educational Administration

Examines the range of federal and state constitutional and statutory sources that apply to the constituents (pupils, parents, teachers, administrators, and board members) engaged in public schools. Emphasizes development of legal analytical skills. *Prerequisite:* EOL 450 or consent of instructor. 1 unit.

471. State and Federal Educational Politics and Policies

Examines the legislative and political processes in the formulation of current federal and state educational policies, together with the evaluation of policy and the formulation of policy alternatives. *Prerequisite:* EOL 469. 1 unit.

474. The American College and University

Introduction to higher education as a subject: its history, purposes, leaders, and literature; attention to conceptual framework in which further development of this subject can progress. 1 unit.

477. Student Personnel Work in Higher Education

Studies the theoretical foundations and principles underlying the practice of student personnel work; investigation of the role and function of student personnel workers in terms of their relationship to various goals, philosophies, issues, trends, and research. 1 unit.

479. Organization and Control of Higher Education

Organizational patterns whereby colleges and universities seek to accomplish their purposes; agencies involved in the control of higher education. *Prerequisite:* EOL 442 or 474, or equivalent. 1 unit.

480. Internship in the Administration of Higher Education

Provides supervised direct experience in the administration of higher education; with the aid of the faculty, students select the institution and position most relevant to their career goals. *Prerequisite:* Consent of instructor. 1 unit. No more than 2 units may be given toward an advanced degree.

484. Continuing Education Internship

Supervised field experience. *Prerequisite:* Consent of instructor. 1 to 2 units. May be repeated to a maximum of 4 units.

486. Continuing Education Advanced Seminar

Analyzes specialized topics related to continuing education of adults; for advanced students. Recommended for majors in continuing education. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ or 1 unit. May be repeated to a maximum of 3 units.

487. Applying Quality Processes in Educational Leadership

Same as HRE 487. See HRE 487.

490. Seminar for Advanced Students of Education

Open only to persons who have been admitted for doctoral study in the Department of Educational Organization and Leadership. *Prerequisite:* Consent of instructor. 1 to 2 units.

491. Field Study and Thesis Seminar

Assists doctoral candidates in planning field studies and thesis problems; students are expected to present their studies at each of four stages: (1) the inception, delimitation, tentative design stage; (2) the proposed design stage; (3) the revised design stage; and (4) the final design stage. Students are expected to analyze all presentations critically. *Prerequisite:* Consent of instructor. 1 to 2 units.

499. Thesis Research

Individual direction of research and thesis writing. 0 to 4 units.

EDUCATIONAL POLICY STUDIES

Head of Department: James D. Anderson
 Department Office: 360 Education Building,
 1310 South Sixth Street, Champaign
 Phone: 333-2446
 URL: www.ed.uiuc.edu/COE/EPS

Educational Policy Studies (E P S)

199. Undergraduate Open Seminar
 1 to 5 hours. May be repeated.

201. Foundations of American Education
 Studies some of the problems of formulating and justifying aims and policies in American education, of designing and systematizing the curriculum, of organization and social context of the public school system, and of the teaching-learning process; examined in terms of perspectives provided by social philosophy, history, sociology, and philosophy of education. 3 hours.

202. Composition II/Foundations of American Education
 Course is identical to E P S 201 except for the additional writing component. See E P S 201. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours. Students may not receive credit for both this course and E P S 201.

210. Race and Cultural Diversity in American Life
 Same as AFRO 210. Study of race and cultural diversity from Colonial era to present; the evolution of racial ideology in an ethnically heterogeneous society; the impact of race on the structures and operations of fundamental social institutions; the role of race in contemporary politics and popular culture. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours.

249. Independent Study
 Designed for students who wish to do advanced readings and research in greater depth and to investigate further ideas and themes that have been explored in E P S 199 and 201. *Prerequisite:* E P S 201; interest as attested to by instructors; and consent of adviser and staff member who supervises the work. 2 hours.

291. Thesis
Prerequisite: Senior standing. 2 hours.

292. Thesis
Prerequisite: Senior standing. 2 hours.

299. Undergraduate Seminar in Educational Policy Studies
 Advanced undergraduate seminar that builds upon introductory work in E P S 201 and includes historical, philosophical, legal, and social science perspectives on education. Requests for activation of this course may come

from students or faculty. *Prerequisite:* EPS 201 or equivalent, and consent of instructor. 0 to 9 hours. May be repeated.

301. Philosophy of Education
 Philosophical examination of selected educational issues; conveys a grasp of the complexities of the issues and some philosophical methods for dealing with them. 2 hours or ½ unit.

302. History of American Education
 Development of American education in relation to political, social, and cultural developments; attention to the influence of movements in the cultural environment upon evolving conceptions of educational theory and practice. 2 hours or ½ unit.

303. Comparative Education
 Introduction to the cross-cultural, cross-national study of educational institutions and their relationship to society. 2 hours or ½ unit. Topics may vary.

304. Social Foundations of Education
 Analyzes normative and conceptual aspects of the interrelationship of school and society, and of reciprocal influences between schools and major social trends and forces. 2 hours or ½ unit.

305. History of Educational Ideas
 Studies selected educational theorists and intellectual movements; provides familiarity with the major educational ideas of the past and historical perspectives on current issues and problems in education; and critical readings of such authors as Aristotle, Plato, Quintilian, St. Augustine, Loyola, Comenius, Rousseau, Pestalozzi, Froebel, Herbart, and Dewey. 2 hours or ½ unit.

306. Aesthetics, The Arts, and Education
 Theoretical introduction to the problems involved in teaching critical appreciation of the arts; examines materials from aesthetics, art history, and criticism for their relevance to the problems of aims, curriculum, organization, and teaching-learning. 2 hours or ½ unit.

307. Aesthetics, Mass Communications, and Education
 Theoretical introduction to the problems involved in teaching a critical understanding of mass communications; examines materials from aesthetics, communication theory, and the social sciences for their relevance to the problems of aims, curriculum, organization, and teaching-learning. 2 hours or ½ unit.

308. Critical Thinking for Teachers
 Examination of critical thinking dispositions and abilities as an approach to the foundations of knowledge and structure of thinking in subject-matter areas. 2 hours or ½ unit.

309. The Politics of Education
 Overview of the political structure and processes through which many of the major issues in education are treated; analyzes nature of the policymaking process in education and discusses the roles of principal participants in the process of educational decision making, but focuses on fundamental recurring issues in education and the ways these issues have

been resolved or not resolved by the overall system. Particular attention to the role that both the federal and state judiciary as well as legislative authority have had in shaping educational policy. 2 hours or ½ unit.

310. Economics of Education
 Introduction to economic concepts and their application to education, including investment and consumption theories of education and the role of human capital in economic growth and development; cost-benefit analyses in education, education and the distribution of income, and manpower and educational planning. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

311. History of Western European Education: Antiquity to the Early Modern Era
 Same as HIST 308. Cultural history of western European educational practice with special focus on Classical Greece, the Hellenistic world, Rome, early Christianity, the middle ages, the twelfth century renaissance, scholasticism and the fourteenth century renaissance. *Prerequisite:* Completion of campus Composition I general education requirement. 3 hours or ½ unit.

312. History of Western European Education: Early Modern Era to the Twentieth Century
 Same as HIST 315. Cultural history of western European educational practice with special focus on the fifteenth century renaissance, the Reformation and Counter-reformation, Enlightenment, and 19th-century national schooling systems in Germany, France, and England. *Prerequisite:* Completion of campus Composition I general education requirement. 3 hours or ½ unit.

314. Race and Ethnic Issues in Family Sociology and Education
 Same as AFRO, and HDFS, and SOC 314. Graduate-level sociological examination of how gender, race, ethnicity, cultural diversity and class function in the development of diverse American families, which are important foundations of education. Primary attention will be given to African American and Hispanic families. Secondary attention will be given to Asian American, Native American and other racial and ethnic family groups. *Prerequisite:* SOC 100, a 200-level SOC course, or consent of instructor. 2 hours or ½ unit.

315. Sociology of Education
 Same as SOC 315. Education as a social process in various cultures and historical periods, emphasizing current systems in Westernized countries. *Prerequisite:* SOC 100; or six hours of anthropology, social geography, political science, or sociology. 2 hours or ½ unit.

385. Anthropology of Education
 Same as Anthropology and EDPSY 385. Introduction to the contribution of anthropology to the cross-cultural study of education, including discussion of material from representative cultures ranging from primitive social groups to present-day national states; special attention to education of minority ethnic and subordinate cultures; and emphasis on both

informal and formal education as cultural process in relation to culture transmission, evolution, change, and development. *Prerequisite:* A course in anthropology or sociology, or consent of instructor. 2 or 4 hours, or ½ or 1 unit.

399. Issues and Developments in Educational Policy Studies

Seminar on topics not treated by regularly scheduled courses; requests for initiation may be made by students or faculty members. 2 to 4 hours, or ½ to 1 unit. May be repeated to a maximum of 8 hours or 2 units.

400. Traditions in Philosophy of Education
Analyzes major trends and primary sources in philosophy of education, drawing mainly from the 20th century. Movements covered will include pragmatism, concept analysis, phenomenology, feminism, and Marxism/Critical theory. This course is required of all Philosophy of Education graduate students. *Prerequisite:* An appropriate 300 and 400 level course work in philosophy, philosophy of education, or consent of the instructor. 1 unit.

401. Modern Theories of Education
Analyzes the assumptions about knowledge and values that provide a basis for different conceptions of educational theory, research and practice. *Prerequisite:* Course work in philosophy, philosophy of education, or consent of instructor. 1 unit.

402. Educational Movements in the Twentieth Century

Historical study of significant educational trends during the past sixty years, with special reference to their influence on American education; an analytical examination of the principal transition movements in the last decade of the nineteenth century and of efforts to solve the problems since 1900. 1 unit.

403. The Historical Foundations of American Educational Thought

Studies the evolution of educational theories and philosophies since the eighteenth century; particular reference to their impact upon educational developments in the United States; a broad view of the general growth of American educational thought; and attention to selected major educational theorists, or schools of thought, exploration of their fundamental ideas, and the relation of these ideas to significant intellectual currents in American culture. *Prerequisite:* Consent of instructor. 1 unit.

404. Seminar in Educational Classics

Reading and group discussion of a limited number of the most important writings in educational philosophy which have had a profound influence on the progress of educational thought and practice. *Prerequisite:* E P S 305 or equivalent; consent of instructor. 1 unit.

405. Foundations of Aesthetic Education

Philosophical approach to the problems of teaching for appreciation in formal education; appraisal of the status of aesthetic education, its nature and function, and its relation to other types of education. *Prerequisite:* E P S 306 or equivalent. 1 unit.

406. Seminar in the History of Education

Intensive group study of a small number of selected problems to assist individual students to develop an understanding of and the ability to use the techniques of historical research in furthering such study; problems studied are selected in the light of the interests and previous training of the group of students enrolled. *Prerequisite:* Two courses in the history of education or consent of instructor. 1 unit.

407. Philosophy of Language and Education

Examines philosophical issues in language meaning, and use, as they pertain to educational problems. Topics range from issues in logic, analysis, or critical thinking to contemporary discourse theory. *Prerequisite:* Course work in philosophy, philosophy of education, or consent of instructor. 1 unit.

408. Theories of Knowledge and Education

Examines philosophical issues in the construction, justification and transmission of knowledge, as they pertain to educational processes. *Prerequisite:* Course work in philosophy or philosophy of education, or consent of instructor. 1 unit.

409. Ethics and Education

Examines issues in moral philosophy as they pertain to education. Topics include current theories of moral education, ethical problems in teaching, or topics of moral dispute in educational policy. *Prerequisite:* Course work in philosophy, philosophy of education, or consent of instructor. 1 unit.

410. Social and Political Theories and Education

Examines philosophical issues in social and political theory as they pertain to educational problems. The course includes topics such as autonomy, democratic education, educational reform, and social change. *Prerequisite:* Course work in philosophy, philosophy of education, or consent of instructor. 1 unit.

411. Philosophical Issues in Educational Research

Examines some crucial assumptions and concepts of contemporary research in education from the point of view both of the consumer and the practitioner of educational research. Topics include paradigm conflicts, causal attributions in social science, assessment, ethical problems in the conduct of research, and the assumptions of quantitative research. *Prerequisite:* Course work in philosophy, philosophy of education or consent of instructor. 1 unit.

412. John Dewey's Philosophy of Education

Focuses on Dewey's Philosophy of Education emphasizing the intensive study of original works. *Prerequisite:* Course work in philosophy, philosophy of education or consent of instructor. 1 unit.

413. Contemporary Perspectives in Philosophy of Education

Analyzes exemplary current work in the field, covering a range of contrasting philosophical

issues and approaches. The course goal is to provide familiarity with notable contemporary authors from a variety of perspectives. *Prerequisite:* Course work in philosophy, philosophy of education or consent of instructor. 1 unit.

417. Ethical Dimensions of Educational Policy

Designed to prepare students to analyze ethical issues involved in educational policy making, policy administration, and policy evaluation; includes topics such as educational equity, privacy, due process, and compliance; draws upon multiple disciplines to analyze issues developed out of practice. *Prerequisite:* Open to students who have fulfilled their social foundations requirements and other students with consent of instructor. 1 unit.

449. Independent Study

Offers opportunity and challenge of self-directive, independent study; develops the individual's ability as an independent student and enables the student to pursue needed study in a field in which appropriate courses are not being offered during a given semester. *Prerequisite:* Approval of study outline by adviser and the department chairman prior to enrollment. ½ or 1 unit. May be repeated for credit with consent of adviser and department chair.

485. Education in the Developing Countries

Analyses of the role and functions of education in social, political, and economic development, with particular reference to the new and the developing countries. *Prerequisite:* Consent of instructor. 1 unit.

490. Seminar for Advanced Students of Education

Seminar in educational policy studies; sections offered in the following fields: (a) history of education; (b) philosophy of education; (c) comparative education; (d) social foundations of education; (e) philosophy of educational research; and (f) historical methods in education. *Prerequisite:* Consent of instructor. 1 unit. May be repeated.

491. Field Study and Thesis Seminar

Assists doctoral candidates in planning field studies and thesis problems; students are expected to present their studies at each of four stages: (1) the inception, delimitation, tentative design stage; (2) the proposed design stage; (3) the revised design stage; and (4) the final design stage. Students are expected to analyze all presentations critically. *Prerequisite:* Open only to students who have been admitted for doctoral study. 1 to 2 units.

499. Thesis Research

Individual direction of research and thesis writing. 0 to 4 units.

EDUCATIONAL PRACTICE

Offices for Student Teaching: Agricultural Education, 151 Bevier Hall; Art Education, 121 Art & Design Building; Secondary Education, 398 Education Building; Foreign Language, 2090 FLB; Kinesiology, 119 Freer Hall; Music Education, 3004 Music Building; Special Education, 288 Education Building; Speech Communication, 244 Lincoln Hall; Speech and Hearing, 231 Speech and Hearing Building. *Phone:* See Web site for phone numbers. *URL:* www.ed.uiuc.edu/cte/org.html

Note: Students entering teacher education curricula with 55 or more semester hours should apply for student teaching assignments during the first semester in the curriculum. However, such students must complete at least a semester before they may be admitted to student teaching.

Educational Practice (ED PR)

150. School and Community Experiences

Early field experiences in teacher education, including observation and laboratory experiences in public schools: designed to provide opportunities for career exploration, professional orientation, the development of insight into the interrelationship of theory and practice, and the place of the student in the educational process. *Prerequisite:* Consent of instructor. 0 to 4 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

220. Educational Practice in the Education of Exceptional Children

Course in practice teaching which provides teaching experience with exceptional children. *Prerequisite:* Senior standing; consent of department; sufficient hours of background courses; 2.5 cumulative and University of Illinois GPA. 2 to 8 hours.

232. Educational Practice in Elementary Education

Course in practice teaching to meet certification requirements for teaching in the elementary school. *Prerequisite:* C & I 320, or 306 as required by the student's curriculum; senior standing; 100 hours of early field experience; 2.5 cumulative and University of Illinois GPA. 2 to 8 hours.

238. Educational Practice for Special Fields in Elementary Schools

Course in student teaching to meet requirements for certification in special fields at the elementary school level. *Prerequisite:* For students in the early childhood education curriculum, C & I 320 required and concurrent enrollment in C & I 321; consent of instructor; 100 hours of early field experience; 2.5 cumulative and University of Illinois GPA. 3 to 8 hours.

lative and University of Illinois GPA. 3 to 8 hours.

242. Educational Practice in Secondary Education

Course in practice teaching to meet certification requirements for teaching in the secondary school. *Prerequisite:* Satisfactory progress in an approved teacher education program, including 100 hours of early field experience; 2.5 cumulative and University of Illinois GPA. 2 to 8 hours.

EDUCATIONAL PSYCHOLOGY

Department Chairperson: Lizanne DeStefano
Department Office: 210 Education Building, 1310 South Sixth Street, Champaign
Phone: 333-2245
URL: www.ed.uiuc.edu/edpsy/main

Educational Psychology (EDPSY)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

211. Educational Psychology

Basic undergraduate course in psychology of education for prospective teachers; materials and principles from the various areas of psychology (mental hygiene, psychology of learning, etc.) applied to the practical problems of teaching. Includes limited voluntary participation as a subject in experiments. *Prerequisite:* PSYCH 100. 3 hours.

236. Child Development for Elementary Teachers

Study of child growth and development designed particularly for those preparing to teach in the elementary school; special emphasis on the significance of the developmental process for educational programs and procedures; and systematic experience in studying and evaluating children's behavior and in supporting their learning and development. Includes limited voluntary participation as a subject in experiments. *Prerequisite:* PSYCH 100. 3 hours. Credit is not given for both EDPSY 236 and PSYCH 216.

249. Independent Study

Study of problems not considered in other courses; designed for students who excel in self-direction and intellectual curiosity. *Prerequisite:* Upperclass status; upper five percent of class in grade-point average; demonstrated writing competence, research potential, scholarly attitude, and interest as attested to by instructor; consent of adviser and staff member who supervises the work. 1 to 4 hours.

250. Career Development Theory and Practice

Design and implementation of an innovative life planning process; a participatory experi-

ence that includes a survey of theories, models, and research on life planning and that encourages systematic skill identification, values clarification, and the development of job search strategies. 3 hours.

290. Elements of Statistics

Course content includes descriptive statistics, correlation, regression, the normal curve, statistical interference, and the presentation of statistics. The course does not require calculus and makes use of examples drawn from education, medicine, social science, business, and the popular media. Designed for professional training of students whose major interests are not in math or science. *Prerequisite:* MATH 112, 116, or 118. 4 hours. Students may not receive credit for both this course and STAT 100 or 210; ECON 172 or 173; ACE 261; PSYCH 233, 234, or 235; SOC 185; CPSC 340; or EDPSY 390.

291. Thesis

Prerequisite: Senior standing. 2 hours.

292. Thesis

Prerequisite: Senior standing. 2 hours.

311. Psychology of Learning for Teachers

Study of the psychology of human learning as it applies to instruction, educational issues, and educational problems. *Prerequisite:* EDPSY 211 or equivalent. 3 hours, or ½ or 1 unit.

312. Theories and Problems of Adjustment in School Settings

Examines theories of adjustment, factors that influence adjustments, and common adjustment problems of children and adolescents in school contexts. *Prerequisite:* EDPSY 211 or equivalent. 3 hours, or ½ or 1 unit.

313. Child Language and Education

Provides an overview of current knowledge about children's acquisition of communicative competence together with a consideration of the educational import of this developmental process. *Prerequisite:* EDPSY 211 or 236; or equivalent. 3 hours, or ½ or 1 unit.

314. Sociocultural Influences on Learning

Provides a general overview of the relationship of language, culture, and society to the teaching-learning process; gives broad exposure to research and theory concerned with the effects of sociocultural factors on cognition, perception, and motivation; also considers the effect of such factors on classroom interaction. *Prerequisite:* EDPSY 211 or 236; or equivalent. 3 hours, or ½ or 1 unit.

315. Personality and Social Development

Same as PSYCH 365. See PSYCH 365.

316. Discipline and Classroom Management

General overview of theories related to analyzing student behaviors in the classroom; the incidence and etiology of conduct problems and behavior disorders in the classroom, with emphasis upon preventive strategies and guiding principles for maintaining classroom discipline. *Prerequisite:* EDPSY 211 or 236, or equivalent. 3 hours, or ½ or 1 unit.

320. Early Adolescent Development

Course examines early adolescent development designed particularly for those preparing to teach in the middle grades; special emphasis is given to physical, cognitive, emotional, and social transitions in early adolescence and to understanding how these developmental transitions influence educational programs and procedures. Course will include observational experiences and encourages teachers to become facilitators of learning and development and consumers of research on early adolescence. Includes limited voluntary participation as a subject in experiments. *Prerequisite:* For 2 hours (½ unit): EDPSY 211, 236, or equivalent, junior standing, and acceptance into one of the UIUC teacher preparation programs; or current holder of State of Illinois Teacher Certification. For 3 hours (1 unit): EDPSY 211, 236, or equivalent, and junior standing. 2 or 3 hours, or ½ or 1 unit. For Secondary certification students, 2 hours (½ unit) enrollment is expected during the fall or spring. Other students seeking middle grade endorsement may enroll for 2 hours (½ unit) in the summer. Students not enrolled in a certification sequence nor seeking middle grade endorsement will be required to take the course for 3 hours (1 unit).

335. Ethnography of Local Cultures

Same as ANTH and SOC 335. Introduction to ethnographic modes of researching culture in human activities, events, organizations, and thinking through participant observation in local settings; focus on the central tasks of ethnographic research (discovery, representation, presentation, justification) through mastery of field notes and various equipment. *Prerequisite:* EDPSY 314, ANTH 230, or equivalent work in social sciences. 4 hours or 1 unit.

341. Applications of Sex Role Theory to Counseling

Same as WS 341. Reviews research on sex role socialization related to career, family, and personal roles for both sexes; discusses counseling strategies aimed at freeing persons from attitudes and behaviors that limit their freedom to choose; and reviews strategies for change at policy, agency and individual levels. 4 hours or 1 unit.

343. Individual Intelligence Testing

Fundamental concepts relevant to the general problem of the individual testing of learning aptitude; acquisition of psychometric competence in the use of the 1960 Binet and the Wechsler tests; and acquaintance and limited practice in the administration, scoring, and interpretation of results obtained by performance scales and other devices appropriate for use with individuals having sensory, associative, and/or motor impairments. *Prerequisite:* Consent of instructor and 6 hours of psychology and SP ED 324, or EDPSY 392 or PSYCH 390. 3 hours or 1 unit.

359. Professional Skill Development Workshop in Educational Psychology

Laboratory, pre-practica, or workshops designed to teach practitioner-oriented skills in specialized areas of educational psychology; requests for initiation of sections in this course may be made by students or by faculty mem-

bers. *Prerequisite:* Junior standing. 2 to 4 hours, or ½ to 1 unit. May be repeated to a maximum of 8 hours or 2 units.

360. Introduction to Counseling and Psychotherapy

Same as PSYCH 367. Study of counseling and psychotherapeutic processes and theories. Coverage of major models and theories as well as current trends and a review of counseling skills will be included. *Prerequisite:* PSYCH 238 or equivalent. 4 hours or 1 unit.

362. Adult Learning and Development

Theory of and research on adult learning and development; includes societal context, performance, physiology and health, personality, and learning; and considers stability and change during young adulthood, middle age, and old age. *Prerequisite:* EDPSY 311 or 312, or equivalent, or consent of instructor. 4 hours or 1 unit.

363. Instructional Design

The design, systematic development, and evaluation of instructional programs, including delineation of performance outcomes, analysis of concepts, design of instructional sequences, assessment of student performance, and survey of current research. Each student develops an instructional program. *Prerequisite:* A foundation course in educational psychology or psychology. 4 hours or 1 unit.

385. Anthropology of Education

Same as ANTH and E P S 385. See E P S 385.

387. Computer Use in Education

Overview of the nature and development of automation in education; use of electronic data processing systems for administrative purposes, for instruction, and for research; discussion of problems of computer management, natural language analysis, and simulation CAI applications; and laboratory experience with on-line terminals, remote entry devices, and peripheral equipment. *Prerequisite:* EDPSY 390 or equivalent, or consent of instructor. 3 hours or 1 unit.

390. Elements of Educational Statistics

Designed for terminal value for professional training of students not intending to pursue advanced graduate work, and for introductory value for students continuing graduate study in education; descriptive statistics, introduction to correlation and regression, the normal curve, statistical inference, and the presentation and interpretation of statistical data in educational literature. *Prerequisite:* Junior standing. 3 hours or 1 unit.

391. Assessment Issues for Classroom Teachers

Designed especially for secondary education majors, course introduces students to basic concepts in assessment including: characteristics of traditional and alternative assessment practices, purposes of assessment, aligning curricula and assessment, assessment standards, administration, scoring, and interpretation. The discussion sections are organized by content specialization, they are project-based and provide students with supervised

experience in developing, administering, scoring and interpreting traditional and alternative assessments. *Prerequisite:* EDPSY 211 or 236; undergraduates should be concurrently enrolled in C & I 303. 2 hours or ½ unit.

392. Introduction to the Principles of Measurement

Study of the selection, preparation, administration, and interpretation of psychological and educational tests and diagnostic devices; emphasis on theory at a beginning level, with application to hypothetical school situations as a teaching device; and consideration of the sources of standard tests, criteria for their evaluation, methods of scoring, interpretation, and general and special areas. *Prerequisite:* EDPSY 211 or 236. 4 hours or 1 unit.

398. Evaluation Methods

Introduces the methodology of educational program evaluation, including the design of an evaluation, the data collection techniques, approaches to data summarization, and the reporting and utilization of evaluative information; each student designs and conducts an evaluation project. *Prerequisite:* EDPSY 390. 3 hours or 1 unit.

399. Issues and Developments in Educational Psychology

Experimentation or seminar on topics not treated by regularly scheduled courses. Requests for initiation of the course may be made by students or by faculty members. 2 or 4 hours, or ½ or 1 unit. May be repeated to a maximum of 8 hours or 2 units.

415. Psychological Theories Applied to Education

Advanced course in human behavior; special attention given to contemporary systems of psychology and their relationship to educational practice. *Prerequisite:* EDPSY 311 and 312; EDPSY 411 or 412. 1 unit.

416. Psychology of Reading

Same as PSYCH 426. Overview of psychological research investigating the perceptual and cognitive processes that occur during reading. Examines the development of reading ability, reading disorders, and the measurement of reading ability. *Prerequisite:* A previous course in experimental or cognitive psychology or linguistics, or consent of instructor. 1 unit.

420. Professional Seminar in Counseling Psychology

Reviews the psychologists' professional code of ethics, the history of counseling psychology as a profession, and current theoretical and applied issues within the field of counseling psychology. 0 or 1 unit.

423. Use of Tests in Counseling

Provides instruction and practice in the critique, selection, administration, and interpretation of tests of four basic types used in counseling: aptitude, achievement, interest, and personality; builds on knowledge and skill obtained in prerequisite courses in measurement and counseling psychology. *Prerequisite:* EDPSY 392. 1 unit.

424. Supervised Practice in Educational Psychology

Intensive supervised experiences in applied educational psychology; use of a wide variety of diagnostic and observational techniques and treatment. Students may take more than one section. *Prerequisite:* Master's degree in educational psychology or equivalent; consent of instructor. $\frac{1}{2}$ to 2 units.

427. Theories and Practice of Group Counseling

Study of the principles of group process and their application in institutional and other settings; includes a review of the historical development of group processes and study of pertinent research; discussion and experiential activities are supplemented by films, videotapes, and case studies. *Prerequisite:* EDPSY 420 or consent of instructor. 1 unit.

428. Theories of Career Development and the Use of Occupational Information

Results of recent occupational research and use of these results by teachers and counselors; attention given to research techniques suitable for use in local occupational studies. *Prerequisite:* An introductory course in counseling or consent of instructor. 1 unit.

429. Field Instruction in Educational Psychology

Individual instruction designed to help the advanced student apply basic principles of education or psychology in institutional settings. Each student is assigned to a school, community agency, or other applied settings for a supervised field experience in some aspect of educational psychology. *Prerequisite:* Master's degree in educational psychology or equivalent, and consent of instructor. 1 to 4 units. May be repeated to a maximum of 4 units; no more than 2 units may be taken in any given semester.

431. Counseling Process Research

Overview of research investigating what transpires in counseling, and psychotherapy, and what contributes to effectiveness. Focuses on current research design, methodology, and knowledge in examining how counseling contributes to change. *Prerequisite:* EDPSY 496 or equivalent, and a practicum in counseling, or consent of instructor. 1 unit.

440. Social Development

Same as PSYCH 440. Research and theory relating to the social development of children; special attention to processes of social learning, environmental influences on social behavior, and the role of education in facilitating the development of social skills; and emphasis on experimental research conducted in naturalistic settings. *Prerequisite:* EDPSY 236 or PSYCH 216, or equivalent; and EDPSY 390, PSYCH 235, or equivalent. 1 unit.

442. Cross-Cultural Studies of Literacy

Combines anthropological and psychological approaches to literacy in theory and practice, using case studies of cultural meanings and uses of literacy in worldwide array of traditional, historical, and modern settings; topics include origins and definitions of writing systems, psychology of scripts and math nota-

tions, issues of cultural cognitive consequences, out-of-school acquisition and uses, autonomous vs. ideological meanings of texts, hegemony and writing, roles of readers, and interpretive communities. *Prerequisite:* EDPSY 311 or 314, or C & I 370 or equivalent. 1 unit.

449. Independent Study

Offers opportunity and challenge of self-directive, independent study; develops the individual's ability as an independent student; and enables the student to pursue needed study in a field in which appropriate courses are not being offered during a given semester. *Prerequisite:* Approval of study outline by adviser and the department chairperson prior to enrollment. $\frac{1}{2}$ or 1 unit. May be repeated for credit with consent of adviser and department chair.

450. Methods of Educational Inquiry

Same as C & I and SP ED 450. See C & I 450.

451. Evaluation of Educational Programs

Same as C & I 418. See C & I 418.

470. The Methodology of Eye Movements in the Study of Cognition

Same as PSYCH 472. Teaches use of eye movement monitoring techniques to study issues concerning perception, attention and cognition. Uses of eye movement monitoring in research in several fields; use of eyetracking equipment; and writing of computer programs for this type of research. *Prerequisite:* Consent of instructor. 1 unit.

471. Proseminar in Cognitive Science

Same as ANTH and LING 470, C S 449 and PSYCH 471. See ANTH 470.

483. Single Subject Research Design

Same as SP ED 483. See SP ED 483.

484. Methods of Qualitative Research

Primarily for advanced graduate students approaching dissertation research. Develops an understanding of and skill in the use of several data collection techniques associated with naturalistic, cross-cultural, and single-culture research. These techniques, to be employed in an actual research project of the student's choice, are: (1) working with informants; (2) developing questions for use on questionnaires and in interviewing; (3) back translation; (4) conducting pilot studies; and (5) conducting depth-probe interviews. 1 unit.

485. Multivariate Correlational Techniques in Educational Research

Same as PSYCH 486. Emphasis on educational research applications of correlational techniques; special attention to issues in principles of research design underlying appropriate uses of such techniques as multiple, partial, and part (semipartial) correlation and factor analysis; and illustration of techniques by examples drawn from published studies and projects conducted on this campus. Emphasis will be placed on application and interpretation of techniques rather than on theoretical rationales. *Prerequisite:* EDPSY 496 or equivalent; consent of instructor. 1 unit.

486. Methods of Naturalistic Research, II

Course builds on the research experience of EDPSY 484, which requires students to prepare and administer an interview schedule. The resulting transcripts are the basis for the work of this course. They provide each student with their own set of data for working on the three major aspects of the course; coding and analysis of data; the development of theory and other outcomes of qualitative research; and the forms of narrative in the write up of qualitative data. *Prerequisite:* EDPSY 484, or approval of instructor. 1 unit. Approval will be granted if a student has had equivalent experience and has collected data that can serve as the basis for this course's proposed activities.

488. Covariance Structure and Factor Models

Same as PSYCH, SOC, and STAT 488. See PSYCH 488.

490. Seminar for Advanced Students of Education

Seminar in educational psychology; topics relate to the areas of specialization represented by the various divisions within the department. *Prerequisite:* Consent of instructor. 0 to 1 unit. May be repeated to a maximum of 2 units in any area of specialization.

491. Field Study and Thesis Seminar

Assists doctoral candidates in planning field studies and thesis problems. Students are expected to present their studies at each of four stages: (1) the inception, delimitation, tentative design stage; (2) the proposed design stage; (3) the revised design stage; and (4) the final design stage. Students are expected to analyze critically all presentations. *Prerequisite:* Limited to students who have been admitted for doctoral study. 1 to 2 units.

492. Psychology of Learning and Instruction

Same as PSYCH 492. Advanced course in the nature and conditions of long-term cognitive learning and retention in classroom and similar situations; intended for doctoral students with a special interest in research leading to the improvement of classroom teaching and learning, in psychological aspects of curriculum research, and in the cognitive aspects of military and industrial training. *Prerequisite:* Consent of instructor. 1 unit.

494. Multivariate Analysis in Psychology and Education

Same as PSYCH and SOC 494. See PSYCH 494.

495. Theories of Measurement

Same as PSYCH 495. Classical test theory (true score, error of measurement, reliability and validity of test scores, composite measures); proposed alternatives to the classical model (generalizability theory, matrix sampling, latent trait theory, criterion-referenced measurement). *Prerequisite:* EDPSY 496 or PSYCH 307, or equivalent; EDPSY 392 or PSYCH 390, or equivalent. 1 unit.

496. Statistical Methods in Education

Introduction to inferential statistical methods in education; includes probability theory, distribution theory, interval estimation, hypothesis testing, regression and correlational analysis, and analysis of variance. *Prerequisite:* EDPSY 390 or equivalent. 1 unit.

497. Advanced Statistical Methods in Education

Advanced topics in analyses of variance and covariance, and principles of experimental design; brief introduction to multivariate analysis, including rudiments of matrix algebra. *Prerequisite:* EDPSY 496, PSYCH 307, or equivalent. 1 unit.

498. Theories of Educational Evaluation

Study of the process of educational program evaluation, its purpose and procedures, with emphasis on settings, personnel, and performance; review of principal theories; and study of models, histories, political contexts, ethics, and epistemology of evidence as they relate to the observation, judging, and reporting of educational programs. *Prerequisite:* EDPSY 390 and 392 and a course in evaluation, or consent of instructor. 1 unit.

499. Thesis Research

Individual direction of research and thesis writing. 0 to 4 units.

ELECTRICAL AND COMPUTER ENGINEERING

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Electrical and Computer Engineering (ECE)

110. Introduction to Electrical and Computer Engineering

Integrated introduction to selected fundamental concepts and principles in electrical and computer engineering: circuits, electromagnetics, communications, electronics, controls, and computing. Laboratory experiments and lectures focus on a design and construction project, such as an autonomous moving vehicle. *Prerequisite:* Credit or registration in either MATH 120 or 135. 4 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Seminar

Discussions of educational programs, career opportunities, and other topics in electrical and computer engineering. 0 hours. For ECE students.

205. Introduction to Electric and Electronic Circuits

Basic principles of circuit analysis, transient analysis, AC steady-state analysis, introduction to semiconductor devices and fabrication, digital logic circuits, op-amps, and A/D and D/A conversion. *Prerequisite:* PHYSICS 112, MATH 242 or 245. 3 hours. ECE students may not receive credit for this course.

206. Introduction to Electric and Electronic Circuits Laboratory

Laboratory instruments and basic measurement techniques, electric circuits, CMOS logic circuits, DTL and TTL circuits, and op-amps. *Prerequisite:* PHYSICS 112, MATH 242 or 245; concurrent registration in ECE 205. 1 hour. ECE students may not receive credit for this course.

210. Analog Signal Processing

Introduction to analog signal processing, with an emphasis on underlying concepts from circuit and system analysis: linear systems, review of elementary circuit analysis, differential equation models of linear circuits and systems, Laplace transform, convolution, stability, phasors, frequency response, Fourier series, Fourier transform, active filters and AM radio. *Prerequisite:* ECE 110 and PHYSICS 112. Credit or concurrent registration in MATH 285. 4 hours.

211. Topics in Analog Circuits and Systems

Introduction to concepts from circuit and system analysis: linear systems, review of elementary circuit analysis, op amps, transient analysis, differential equation models of linear circuits and systems, Laplace transform. *Prerequisite:* ECE 110, MATH 285, and PHYSICS 107. 2 hours. Students may not receive credit for both this course and ECE 210.

216. Engineering Ethics

Same as PHIL 216. Ethical issues in the practice of engineering: safety and liability, professional responsibility to clients and employers, whistle-blowing, codes of ethics, career choice, legal obligations; case studies. *Prerequisite:* Junior standing; and RHET 105. 3 hours.

229. Introduction to Electromagnetic Fields

Elementary electromagnetic field theory as summarized in Maxwell's equations for time-varying fields in integral and differential forms; energy storage; static and quasistatic fields; and time-domain analysis of waves. *Prerequisite:* ECE 205 or 210. 3 hours.

230. Computer Solution of Electromagnetics Problems, I

Solution of selected electromagnetics problems at the ECE 229 level using personal computers. *Prerequisite:* Credit or concurrent registration in ECE 229. 1 hour.

246. Advanced Digital Projects Laboratory

Planning, designing, executing, and documenting a microcomputer based project. Hardware is emphasized but the special projects required of student may also require an equal emphasis on software. *Prerequisite:* ECE 249 or consent of instructor. 2 to 3 hours.

249. Digital Systems Laboratory

Introduction to the experimental analysis and synthesis of digital networks, including the use of a microcomputer as a controller. *Prerequisite:* ECE 110 and 290. 2 hours.

271. Electrical and Computer Engineering Special Topics

Prerequisite: As specified by department or instructor. 0 to 4 hours.

272. Electrical and Computer Engineering Problems

Prerequisite: Approved written application to department as specified by department or instructor. 0 to 4 hours.

280. Biomedical Imaging

Same as BIOEN 280. Introduction to the physics and engineering principles associated with magnetic resonance, ultrasound, computed tomography and nuclear imaging. *Prerequisite:* MATH 285 and PHYSICS 112, or consent of instructor. 3 hours.

290. Introduction to Computer Engineering

Introduction to digital logic and computer systems. Examines representation of information, combinational network analysis and design, sequential network analysis and design, computer organization and control, and machine-level programming. *Prerequisite:* CS 101 or 125. 3 hours. Credit is not given for both ECE 290 and CS 231.

291. Computer Engineering, II

Design and development of assembly language programs; input-output, interrupts, multitasking; introduction to data structures and graphics; ethical and social issues in computing; laboratory assignments on real-time data acquisition and device control. *Prerequisite:* ECE 290, or CS 231. 3 hours. Credit is not given for both ECE 291 and CS 232.

296. Honors Project

Special project or reading course for James Scholars in engineering. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

297. Honors Seminar

Special lecture sequences and/or discussion groups arranged each semester to bring James Scholars in engineering into direct contact with the various aspects of engineering practices and philosophy. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

298. Senior Research Project

Individual research project under the guidance of a faculty member: for example, mathematical analysis, laboratory experiments, computer simulations, software development, circuit design, or device fabrication. Preparation of a written research proposal, which includes preliminary results. *Prerequisite:* Senior standing; RHET 105; and consent of instructor. 2 hours.

299. Senior Thesis

Completion of the research project begun under ECE 298. Preparation and oral presentation of a written thesis that reports the results

of the project. *Prerequisite:* ECE 298, and consent of instructor. 2 hours.

302. Electronic Music Synthesis

Historical survey of electronic and computer music technology; parameters of musical expression and their codification; analysis and synthesis of fixed sound spectra; time-variant spectrum analysis/synthesis of musical sounds; algorithms for dynamic sound synthesis. *Prerequisite:* MUSIC 202 or equivalent; ECE 290 and 310. 3 hours or $\frac{3}{4}$ unit.

303. Topics in Audio Engineering

Review of resonance and wave phenomena; acoustics of rooms and auditoriums; artificial reverberation and sound localization/spatialization; loudspeakers, enclosures, and microphones; and topics in digital audio. *Prerequisite:* ECE 290, 310 and 373, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

310. Digital Signal Processing

Introduction to discrete-time systems and digital signal processing: discrete-time linear systems, difference equations, z-transform, discrete convolution, stability, discrete-time Fourier transform, analog-to-digital and digital-to-analog conversion, interpolation and decimation, digital filter design, discrete Fourier transform, fast Fourier transform, spectral analysis, applications of digital signal processing. *Prerequisite:* ECE 210, or consent of instructor. 4 hours or 1 unit.

311. Microcomputer Laboratory

Design, construction, and use of a small general purpose computer with a micro-processor CPU; MSI and LSI circuits used extensively; control panel, peripheral controllers, control logic, central processor, and programming experiments; and open lab format. *Prerequisite:* ECE 249; ECE 291 or C S 232. 3 hours or $\frac{3}{4}$ unit. Credit or concurrent registration in ECE 312 is recommended.

312. Computer Organization and Design

Basic computer organization and design, computer arithmetic, control design and microprogramming, memory organization, I/D design, reliability/performance evaluation; laboratory for computer design implementation, simulation, and layout. *Prerequisite:* ECE 290 or C S 231; and ECE 291 or C S 232. 4 hours or 1 unit. Graduate credit not allowed for electrical engineering majors.

313. Probability with Engineering Applications

Introduction to probability theory with applications to engineering problems such as the reliability of circuits and systems and to statistical methods for hypothesis testing, decision making under uncertainty, and parameter estimation. *Prerequisite:* ECE 210. 3 hours or $\frac{3}{4}$ unit. Department majors may not receive graduate credit.

314. Biomedical Instrumentation

Same as BIOEN 314. Introduction to engineering aspects of the detection, acquisition, processing, and display of signals from living systems; biomedical transducers for measurements of biopotentials, ions and gases in aqueous solution, force, displacement, blood pres-

sure, blood flow, heart sounds, respiration, and temperature; and therapeutic and prosthetic devices. *Prerequisite:* ECE 205 or 210, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

315. Biomedical Instrumentation Laboratory

Same as BIOEN 315. Laboratory to accompany ECE 314. Studies medical instrumentation and transducers for static and dynamic nonbiological inputs and measures actual biomedical signals; requires some animal experiments. *Prerequisite:* Credit or concurrent registration in ECE 314. 2 hours or $\frac{1}{2}$ unit.

318. Introduction to Image and Video Processing

Basic concepts and applications in image and video processing; introduction to multidimensional signal processing: sampling, Fourier transform, filtering, interpolation and decimation; human visual perception; scanning and display of images and video; image enhancement, restoration and segmentation; digital image and video compression; and image analysis. Laboratory exercises allow students to gain hands-on experience with these topics and develop C and Matlab programs. *Prerequisite:* ECE 310, credit or concurrent registration in ECE 313, STAT 310, I E 230, MATH 315 or 361. 4 hours or 1 unit. Experience with C programming language.

320. Digital Signal Processing Laboratory

Development of real-time digital signal processing (DSP) systems using a DSP microprocessor; several structured laboratory exercises, such as sampling and digital filtering, followed by an extensive DSP project of the student's choice. *Prerequisite:* ECE 310. 2 hours or $\frac{1}{2}$ unit.

321. Plasma and Fusion Science

Same as NUC E 321 and PHYCS 365. See NUC E 321.

325. Introduction to VLSI System Design

Same as C S 335, and CSE 333. Complementary Metal-Oxide Semiconductor (CMOS) technology and theory; CMOS circuit and logic design; layout rules and techniques; circuit characterization and performance estimation; CMOS subsystem design; Very-Large-Scale Integrated (VLSI) systems design methods; VLSI Computer Aided Design (CAD) tools; laboratory experience in custom VLSI chip design on workstations using concepts of cell hierarchy; final project involving specification, design and evaluation of a VLSI chip or VLSI CAD program; and written report and oral presentation on the final project. *Prerequisite:* ECE 249 and 312; or C S 232. 3 hours or $\frac{3}{4}$ unit.

326. Advanced VLSI Design Projects

Same as C S 336. Design of Very Large Scale Integrated (VLSI) chips using either a standard cell or a custom design methodology with the help of computer-aided design (CAD) tools in the VLSI Design Laboratory. Chips designed in the course will be fabricated by an outside organization, and will be tested by students in the laboratory. *Prerequisite:* ECE 325. 2 hours or $\frac{1}{2}$ unit. Written report and oral presentation on project required.

328. Distributed Systems

Same as C S 328 and CSE 324. See C S 328.

330. Power Circuits and Electromechanics

Network equivalents, power and energy fundamentals, resonance, mutual inductance, three-phase power concepts, forces and torques of electric origin in electromagnetic and electrostatic systems, energy conversion cycles, principles of electric machines, transducers, relays, laboratory demonstration. *Prerequisite:* ECE 210. 3 hours or $\frac{3}{4}$ unit. May not be taken for credit by graduate students in electrical engineering.

333. Electric Machinery

Theory and laboratory experimentation with three-phase power, power factor correction, single- and three-phase transformers, induction machines, DC machines, and synchronous machines; includes project work on energy control systems; digital simulation of machine dynamics. *Prerequisite:* ECE 330. 4 hours or 1 unit.

336. Advanced Electric Machinery

Advanced rotating machine theory and practice, dynamic analysis of machines using reference frame transformations, tests for parameter determination, reduced order modeling of machines; mechanical subsystems including governors, prime movers, excitation systems, digital simulation of inter-connected machines. *Prerequisite:* ECE 333. 3 hours or $\frac{3}{4}$ unit.

338. Communication Networks for Computers

Same as C S 338, and CSE 325. See C S 338.

340. Solid State Electronic Devices

Semiconductor materials and their electronic properties and applications to electronic devices; p-n junctions; transistors; junction field effect transistors and MOS devices; and introduction to integrated circuits. *Prerequisite:* PHYCS 114, and credit or concurrent registration in ECE 229. 3 hours or $\frac{3}{4}$ unit. Graduate credit does not count toward degrees in Electrical and Computer Engineering.

341. Physics and Modeling of Semiconductor Devices

Detailed presentation of advanced concepts such as generation-recombination, hot electron effects, and breakdown mechanisms; essential features of small ac characteristics, switching and transient behavior of p-n junctions, bipolar and MOS transistors; addresses fundamental issues for device modeling and discusses the perspective and limitations of Si-devices. *Prerequisite:* ECE 340. 3 hours or $\frac{3}{4}$ unit.

342. Electronic Circuits

Analysis and design of analog and digital electronic circuits using MOS field effect transistors and bipolar junction transistors, with an emphasis on the study of amplifiers in integrated circuits. *Prerequisite:* ECE 210 and 340. 3 hours or $\frac{3}{4}$ unit. May not be taken for graduate credit by students in electrical and computer engineering. Students cannot receive credit for both ECE 342 or 343 and PHYCS 343.

343. Electronic Circuits Laboratory

Laboratory to accompany ECE 342. *Prerequisite:* Concurrent registration in ECE 342. 1 hour or ¼ unit. May not be taken for graduate credit by students in ECE. Students cannot receive credit for both ECE 342 or 343 and PHYCS 343.

344. Theory and Fabrication of Integrated Circuit Devices

Laboratory and lecture course on the physical theory, design, and fabrication of devices suitable for integrated circuitry; includes the electrical properties of semiconductors and techniques (epitaxial growth, oxidation, photolithography diffusion, ion implantation, metallization, characterization) for fabricating integrated circuit devices such as p-n junction diodes, bipolar transistors, and field effect transistors. *Prerequisite:* ECE 340. 4 hours or 1 unit.

345. Senior Design Project Laboratory

Individual design projects in various areas of electrical and computer engineering; projects are chosen by students with approval of the instructor; a written report, prepared to journal publication standards, and an oral presentation are required. *Prerequisite:* Senior standing in ECE. 2 hours or ½ unit. No credit for graduate students in ECE.

347. High-Frequency Circuit Design Using Scattering Parameters

Laboratory and lecture on the use of scattering parameters for the design of high-frequency amplifiers. *Prerequisite:* ECE 353. 2 hours or ½ unit.

348. Introduction to Artificial Intelligence

Same as C S 348. See C S 348.

349. Computer Solution of Electromagnetics Problems, II

Solution of selected electromagnetics problems at the ECE 350 level using personal computers. *Prerequisite:* ECE 230 and credit or concurrent registration in ECE 350, or consent of instructor. 1 hour or ¼ unit. Graduate credit is not counted toward degrees in ECE.

350. Lines, Fields, and Waves

General plane wave solution of Maxwell's equations; reflection and transmission of plane waves; transmission lines; impedance matching; waveguides and cavities; and radiation. *Prerequisite:* ECE 229. 3 hours or ¾ unit. Graduate credit is not counted toward degrees in ECE.

351. Automated Microwave Measurements

Manual and computer controlled laboratory analysis of circuits at microwave frequencies. *Prerequisite:* ECE 350. 3 hours or ¾ unit.

352. Electromagnetic Fields

Plane waves at oblique incidence, wave polarization, anisotropic media, radiation, space communications, and waveguides. *Prerequisite:* ECE 350. 3 hours or ¾ unit.

353. Radio Communication Circuits

Design of a radio system for transmission of information; types of receivers, matching techniques, receiver and antenna noise, types of modulation, high-frequency circuitry, and

point-to-point and satellite communications. *Prerequisite:* ECE 342; credit or concurrent registration in ECE 350. 4 hours or 1 unit.

354. Antennas

Antenna parameters; polarization of electromagnetic waves; basic antenna types; antenna arrays; broadband antenna design; and antenna measurements. *Prerequisite:* ECE 350 or consent of instructor. 3 hours or ¾ unit.

355. Optical Electronics

Optical beams and cavities; semiclassical theory of gain; characteristics of typical lasers (gas, solid state, and semiconductor); and application of optical devices. *Prerequisite:* ECE 350 or PHYCS 333 or consent of instructor. 3 hours or 1 unit.

357. Microwave Devices and Circuits

Electromagnetic wave propagation, microwave transmission systems, passive components, microwave tubes, solid state microwave devices, microwave integrated circuits, S-parameter analysis, microstrip transmission lines. *Prerequisite:* ECE 340 or equivalent, and ECE 350 or equivalent. 3 hours or ¾ unit.

358. Applications of Radio Wave Propagation

Terrestrial atmosphere, radio wave propagation, and applications to radio sensing and radio communication. *Prerequisite:* ECE 350 or consent of instructor. 3 hours or ¾ unit.

359. Communications, I

Introduction to analog and digital modulation techniques, random processes, and power spectral density. Effects of noise on, and bandwidth requirements of, different modulation schemes. *Prerequisite:* ECE 313 or equivalent. 3 hours or ¾ unit.

360. Coherent Optics Laboratory

Introduction to the properties and applications of coherent laser light; experiments in interferometry, optical processors and spatial filtering, holography, optical communications, fiber optics, and special projects. *Prerequisite:* Credit or concurrent registration in ECE 350 or PHYCS 371; or equivalent. 3 hours or ¾ unit.

361. Communications, II

Digital communication systems, modulation, demodulation, channel models, bit error rate, spectral occupancy, synchronization, equalization, and trellis-coded modulation. *Prerequisite:* ECE 359. 3 hours or ¾ unit.

362. Logic Design

Same as C S 362 and MATH 391. Design of combinational networks, hazards, finite state testing machines, design of sequential networks in fundamental mode and pulse mode, state reduction, state assignment and races, and fault detection and testing. *Prerequisite:* ECE 290 or C S 231. 3 hours or ¾ unit.

363. Digital Communications Laboratory

The focus of this laboratory course is digital communications systems. Students will gain hands-on experience in the configuration and performance evaluation of digital communication systems employing both radio and optical signals. *Prerequisite:* ECE 359 or a similar

introductory course in digital communications, ECE 361 is recommended co-requisite. 2 hours or ½ unit.

364. Power Electronics

Switching functions and methods of control such as pulse-width modulation, phase control, and phase modulation; dc-dc, ac-dc, dc-ac, and ac-ac power converters; power components, including magnetic components and power semiconductor switching devices. *Prerequisite:* ECE 342. 3 hours or ¾ unit.

369. Power Electronics Laboratory

Laboratory study of circuits and devices used for switching power converters, solid-state motor drives, and power controllers, including dc-dc, ac-dc, and dc-ac converters and applications; high-power transistors and magnetic components; design considerations, including heat transfer. *Prerequisite:* Credit or concurrent registration in ECE 364; ECE 343 or consent of instructor. 2 hours or ½ unit.

370. Introduction to Robotics

Same as G E 370, and C S 343. Fundamentals of robotics, rigid motions, homogeneous transformations, forward kinematics, inverse kinematics, velocity kinematics, dynamics, and laboratory projects. *Prerequisite:* MATH 315 or 318, or consent of instructor. 2 hours or ½ unit.

371. Topics in Electrical and Computer Engineering

Lectures and discussions relating to new areas of interest. *Prerequisite:* Specified by department or instructor. 0 to 4 hours, or 0 to 1 unit. May be repeated.

373. Fundamentals of Engineering Acoustics

Same as T A M 373. Development of the basic theoretical concepts of acoustical systems; mechanical vibration, plane and spherical wave phenomena in fluid media, lumped and distributed resonant systems, and absorption phenomena and hearing. *Prerequisite:* MATH 285 or equivalent. 3 hours, or ¾ or 1 unit.

374. Ultrasonic Techniques

Ultrasonic wave propagation, generation, detection, and measurement in liquid and solid media, acoustic impedance concepts, ultrasonic absorption and velocity measurement techniques, piezoelectricity, and discussion of industrial, experimental, bioengineering, and medical applications. *Prerequisite:* ECE 373 or equivalent, or consent of instructor. 3 hours, or ¾ or 1 unit.

375. Modeling of Bio-Systems

Same as BIOEN 375. Application of linear systems theory and feedback control systems analysis to biological systems; sensory receptors, neuro-muscular system models, control of eye movement, the pupil control system, man-machine interactions, parameter identification in biological systems; and optional project laboratory. *Prerequisite:* G E 222, M E 265, or ECE 210; or consent of instructor. 3 or 4 hours, or ¾ or 1 unit.

376. Power System Analysis

Examines the development of power system equivalents, per phase network analysis, load flow, symmetrical components, sequence networks, fault analysis, and digital simulation. *Prerequisite:* ECE 330. 3 hours or ¾ unit.

378. Power System Operation and Control

Studies economic operation of power systems, system protection, power system stability, dynamics and control of power systems, high voltage DC transmission, load flow interface, digital simulation. *Prerequisite:* ECE 376. 3 hours or ¾ unit.

379. Robot Sensing

Same as G E 379, and C S 344. Contact and noncontact sensing, force/torque/tactile sensing, proximity sensing, range sensing, visual sensing, image formation, lighting, range estimation, calibration, image analysis, task planning, mobile robotics. *Prerequisite:* ECE 205 or 210 and 370, and C S 223 or equivalents, or consent of instructor. 2 hours or ½ unit.

380. Magnetic Resonance Imaging

Same as BIOEN 380. Fundamental physical, mathematical and computational principles governing the data acquisition and image reconstruction of magnetic resonance imaging. *Prerequisite:* ECE 210 and 280, or consent of instructor. ECE 310 is recommended. 3 hours, or ¾ or 1 unit.

382. Large Scale Integrated Circuit Design

Bipolar and MOS field effect transistor characteristics; VLSI fabrication techniques for MOS and bipolar circuits; calculation of circuit parameters from the process parameters; and design of VLSI circuits such as logic, memories, charge-coupled devices, and A/D and D/A converters. *Prerequisite:* ECE 290 and 342. 3 hours or ¾ unit.

383. Linear Integrated Circuit Design

Basic linear integrated circuit design techniques using bi-polar, JFET, and MOS technologies; operational amplifiers; wide-band feedback amplifiers; sinusoidal and relaxation oscillators; electric circuit noise; application of linear integrated circuits. *Prerequisite:* ECE 342. 3 hours or ¾ unit.

384. Principles of Advanced Microelectronic Processing

Teaches seniors and first year graduate students in Electrical Engineering advanced topics in semiconductor device processing. Covers the principles of advanced methods of pattern delineation, pattern transfer, modern material growth and how these are applied to produce novel and high performance devices and circuits in various semiconductor materials with special emphasis on compound semiconductors. Issues in computer simulation of processes and the manufacturing of devices and circuits are also covered. *Prerequisite:* ECE 344. 3 hours or ¾ unit.

386. Control Systems, I

Analysis and design of control systems with emphasis on modeling, state variable representation, computer solutions, modern design principles, and laboratory techniques. *Prerequisite:* ECE 210 or consent of instructor. 4 hours or 1 unit.

Prerequisite: ECE 210 or consent of instructor. 4 hours or 1 unit.

387. Introduction to Quantum Electronics for Electrical Engineers

Application of quantum mechanical concepts to electronics problems; detailed study of a calculable two-state laser system; and incidental quantum ideas bearing on electronics. *Prerequisite:* PHYCS 383 or consent of instructor. 3 hours or ¾ unit.

388. Compound Semiconductors and Devices

Advanced semiconductor materials and devices course covering elementary band theory, heterostructures, transport issues, three-terminal devices, two-terminal devices, including lasers and light modulators. *Prerequisite:* ECE 340, and either ECE 350 or consent of instructor. 3 hours or ¾ unit.

389. Robot Dynamics and Control

Same as G E 389. See G E 389.

390. Introduction to Optimization

Same as CSE 341. Basic theory and methods for the solution of optimization problems; iterative techniques for unconstrained minimization; and introductory presentation of linear and nonlinear programming with engineering applications. *Prerequisite:* C S 101 or 125, and MATH 280, or consent of instructor. 3 hours or 1 unit.

391. Numerical Analysis: A Comprehensive Introduction

Same as C S 350, CSE 301, and MATH 350. See C S 350.

392. Introduction to Parallel Programming for Scientists and Engineers

Same as C S 320, and CSE 302. See C S 320.

393. Introduction to Computer Architecture for Scientists and Engineers

Same as C S 330, and CSE 303. See C S 330.

394. Introduction to Combinatorial Algorithms for Scientists and Engineers

Same as C S 370, and CSE 304. See C S 370.

397. Projects and Lectures in Quantum Electronics

Studies processes involving quantum mechanical energy transfers in energized media leading to various laser devices and their applications. A series of lectures, supplementing the special projects, offers background information on spectroscopy, collisional energy transfer, laser pumping schemes, modulation at optical frequencies, holography, and other related topics. *Prerequisite:* Senior standing; consent of instructor; ECE 387 is recommended. 3 hours or ¾ unit.

400. Seminar

Required of all graduate students. 0 units.

411. High Performance Computer Architectures: Hardware and Software

Same as CSE 428. Design of high performance computer systems; instruction level concurrency; memory system implementation; pipelining, superscalar, and vector processing; compiler back-end code optimization; profile assisted code transformations; code generation and machine dependent code optimization; cache memory design for multiprocessors; synchronization implementation in multiprocessors; compatibility issues; technology factors; state-of-the-art commercial systems. *Prerequisite:* ECE 412; and C S 326 or equivalent. 1 unit.

Same as CSE 421. Advanced concepts in computer architecture; design, management, and modeling of memory hierarchies, stack-oriented processors, associative processors, pipelined computers, and multiple processor systems; and focuses on hardware alternatives in detail and their relation to system performance/cost. *Prerequisite:* ECE 312 or C S 333, or consent of instructor. 1 unit.

412. Computer Architecture

Same as CSE 421. Advanced concepts in computer architecture; design, management, and modeling of memory hierarchies, stack-oriented processors, associative processors, pipelined computers, and multiple processor systems; and focuses on hardware alternatives in detail and their relation to system performance/cost. *Prerequisite:* ECE 312 or C S 333, or consent of instructor. 1 unit.

413. Digital Signal and Spectral Analysis

Fundamentals of linear least squares estimation of discrete-time signals and their spectra; minimum-norm least squares and total least squares solutions; singular value decomposition; Wiener and Kalman filtering; autoregressive spectral analysis; and the maximum entropy method. *Prerequisite:* ECE 310 and 313 and MATH 318, or equivalent, or consent of instructor. 1 unit.

415. Control System Theory and Design

Synthesis of feedback control systems to meet design specifications, including sensitivity; multivariable systems; introduction to systems with random inputs; state variable techniques; and nonlinear systems. *Prerequisite:* ECE 386 or equivalent, or consent of instructor. 1 unit.

417. Nonlinear and Adaptive Control

Studies design of nonlinear control systems based on stability considerations; examines Lyapunov and hyperstability approaches to analysis and design of model reference adaptive systems; identifiers, observers, and controllers for unknown plants. *Prerequisite:* ECE 415. 1 unit.

420. Electromagnetic Waves and Radiating Systems

Fundamental electromagnetic theory with applications to transmission lines, waveguides, and antennas; introduction to the solution of advanced problems in static electric and magnetic fields. *Prerequisite:* ECE 352. 1 unit.

422. Controlled Fusion Systems, I

Same as NUC E 422. See NUC E 422.

423. Gaseous Electronics and Plasmas

Basic concepts and techniques, both theoretical and experimental, which are used in the areas of gaseous electronics, gas and solid plasmas, controlled fusion, aeronomy, gas lasers, and magnetohydrodynamics. *Prerequisite:* PHYCS 383 or ECE 352, or equivalent; or consent of instructor. 1 unit.

425. Nuclear-Electrical Energy Conversion

Same as NUC E 425. See NUC E 425.

428. Analysis of Nonlinear Systems

Same as T A M 428. Treatment of singular points and stability considerations; consideration of graphical and analytical methods, in-

cluding the perturbation method, variation of parameters, Galerkin's method, and the Ritz method for solving nonlinear differential equations. *Prerequisite:* MATH 341; consent of instructor. 1 unit.

431. Theory of Guided Waves

Propagation of electromagnetic waves in general cylindrical waveguides; stationary principles; non-uniform inhomogeneously filled waveguides; mode and power orthogonality; losses in waveguides; analytical and numerical techniques; microwave integrated circuits waveguides; and optical waveguides. *Prerequisite:* ECE 420; PHYCS 440 and MATH 455 recommended. 1 unit.

432. Compound Semiconductors (Optical Devices)

Properties of III-V and II-VI compound semiconductors and the devices which are unique to these materials; emphasis on materials such as GaAs, Ga(AsP), GaP, CdSe, Cd(SeS), etc., and on luminescence, semiconductor lamps, and semiconductor lasers. *Prerequisite:* Graduate standing in electrical engineering with some background in modern physics; elementary quantum mechanics; elementary semiconductor theory or equivalent. 1 unit.

433. Theory of High-Speed Parallel Computation

Same as C S 433, and CSE and ENG 422. See C S 433.

434. Random Processes

Basic concepts of random processes; linear systems with random inputs; Markov processes; spectral analysis; Wiener and Kalman filtering; applications to systems engineering. *Prerequisite:* ECE 313 or MATH 361 or STAT 310, or consent of instructor. 1 unit.

435. Theory of Semiconductors and Semiconductor Devices

Same as PHYCS 435. Introductory quantum mechanics of semiconductors; energy bands; dynamics of Bloch electrons in static and high-frequency electric and magnetic fields; equilibrium statistics; transport theory, diffusion, drift and thermoelectric effects; and characteristics of p-n junctions, heterojunctions, and transistor devices. *Prerequisite:* Senior-level course in quantum mechanics or atomic physics. 1 unit.

436. Integrated Optics and Optoelectronics

Integrated optical and optoelectronic devices; theory of optical devices including laser sources, waveguides, photodetectors, and modulations of these devices. *Prerequisite:* ECE 355, 387, or PHYCS 386; ECE 388 recommended. 1 unit.

437. Fundamentals of Speech Processing and Recognition

Introduction to the theory and techniques in speech processing and recognition; includes speech production model, spectral analysis, pattern comparison techniques, hidden Markov models (HMM), and HMM-based automatic speech recognition; also includes computer laboratory. *Prerequisite:* ECE 310 and 434, experience with C programming and UNIX systems. 1 unit.

439. Advanced Theory of Semiconductors and Semiconductor Devices

Same as CSE 434. Continuation of ECE 435. Selected advanced topics of current interest in the physics of semiconductors and solid-state devices. *Prerequisite:* ECE 435. 1 unit.

441. Computer Systems Analysis

Same as C S 441, and CSE 424. See C S 441.

442. Design of Fault-Tolerant Digital Systems

Same as C S 436. Advanced concepts in hardware and software fault tolerance; topics addressed include fault models, coding in computer systems, module and system level fault detection mechanism, reconfiguration techniques in multiprocessor systems and VLSI processor arrays, software fault tolerance techniques such as recovery blocks, N-version programming, checkpointing and recovery; survey of practical fault-tolerant systems. *Prerequisite:* ECE 312 or equivalent. 1 unit.

443. Digital System Testing and Design for Testability

Fundamental techniques of detecting failures in complex digital systems, algorithms for automatic test generation, schemes for designing systems to be easily testable and with self test capability; hands-on experience with state-of-the-art computer-aided test tools in the laboratory. *Prerequisite:* ECE 312 and 362, or equivalent. 1 unit.

444. Design of Computer Problem Solvers

Same as C S 444. See C S 444.

445. Advanced Physical Acoustics

Same as T A M 445. Advanced topics in acoustics including physical properties of a fluid; linear propagation phenomena; nonlinear phenomena such as radiation force, streaming, and harmonic generation; cavitation; and absorption and dispersion. *Prerequisite:* ECE 373 or 420, or T A M 458, or equivalent; or consent of instructor. 1 unit.

447. Image Processing

Same as CSE 443. Examines fundamental concepts, techniques, and directions of research in image processing; topics include two-dimensional Fourier transform and filtering, image digitization, coding, restoration, reconstruction, analysis, and recognition. *Prerequisite:* ECE 310 and 313; or equivalent. 1 unit.

448. Computer Models of Cognitive Processes

Same as C S 448. See C S 448.

449. Computer Vision

Same as C S 443. Examines information processing approaches to computer vision, and algorithms and architectures for artificial intelligence and robotics systems capable of vision: inference of three-dimensional properties of a scene from its images, such as distance, orientation, motion, size and shape, acquisition and representation of spatial information for navigation and manipulation in robotics. *Prerequisite:* ECE 348 or C S 225, or consent of instructor. 1 unit.

450. Advanced Robotic Planning

Computational approaches to robot motion planning, configuration space, algebraic decompositions, artificial potential fields, retraction, approximate decompositions, planning under uncertainty, grasp planning and task-level planning. *Prerequisite:* C S 373 or equivalent, and graduate standing. 1 unit.

451. Digital Signal Processing

Same as CSE 442. Reviews basic concepts of digital signals and systems; examines computer-aided digital filter design, quantization effects, decimation and interpolation, fast algorithms for convolution and the DFT; and introduces adaptive signal processing. *Prerequisite:* ECE 310 and 313; or equivalent. 1 unit.

452. Computational Techniques for Circuit Analysis and Design

Same as CSE 432. Formulation of circuit equations; sparse matrix algorithms for the solution of large systems, AC, DC, and transient analysis of electrical circuits; sensitivity analysis; decomposition methods. *Prerequisite:* MATH 315 and ECE 210. 1 unit.

453. Optimum Control Systems

Formulation of the optimization problem; controllability; observability; stability; Lyapunov's second method; application of variational calculus, maximum principle, and principle of optimality to control problems; stochastic control; and adaptive control. *Prerequisite:* ECE 415. 1 unit.

454. Sampled-Data Control Systems

Analysis and design of feedback control systems with digital and sampled data. *Prerequisite:* ECE 415 or equivalent. 1 unit.

455. Control of Stochastic Systems

Stochastic control models; development of control laws by dynamic programming; separation of estimation and control; Kalman filtering; self-tuning regulators; dual controllers; decentralized control. *Prerequisite:* ECE 415 and 434. 1 unit.

456. Coding Theory

Same as C S 477, and MATH 476. General discussion on coding theory with emphasis on the algebraic theory of cyclic codes using finite field arithmetic, decoding of BCH and RS codes, finite field Fourier transform and algebraic geometry codes, convolutional codes and trellis decoding algorithms. *Prerequisite:* MATH 317 or equivalent or consent of instructor. 1 unit.

458. Digital Imaging

Multidimensional signals, convolution, transforms, sampling, and interpolation; design of two-dimensional digital filters; sensor array processing and range-doppler imaging; applications to synthetic aperture radar, optics, tomography, radio astronomy, and beam-forming sonar; image estimation from partial data. *Prerequisite:* ECE 310 and 313, or equivalent. 1 unit.

459. Topics in Communications

Lectures and discussion related to advanced topics and new areas of interest in the theory of communication systems, including infor-

mation theory, coding theory, and communication network theory. *Prerequisite:* Specified each semester or consent of instructor. (It is expected that each offering will have a 400-level course as a prerequisite or co-requisite). 1 unit. May be repeated in the same semester as topics vary to a maximum of 3 units; may be repeated in separate semesters as topics vary to a maximum of 4 units. Two or more sections of this course may be offered in a semester with different outlines. Students registering in more than one section should receive credit separately for each section. Students may not receive additional credit toward a degree from multiple offerings of this course if those offerings have significant overlap, as determined by the Electrical and Computer Engineering department.

461. Signal Detection and Estimation

Introduction to detection and estimation theory, with applications to communication, control, and radar systems; decision-theory concepts and optimum-receiver principles; detection of random signals in noise, coherent and noncoherent detection; and parameter estimation, linear and nonlinear estimation, and filtering. *Prerequisite:* ECE 434 or equivalent, or consent of instructor. 1 unit.

463. Information Theory

Same as CS 478 and STAT 463. Mathematical models for channels and sources; entropy, information, data compression, channel capacity, Shannon's theorems, rate-distortion theory. *Prerequisite:* MATH 366 or ECE 434 or consent of instructor. 1 unit.

467. Communication Network Analysis

First high-level course in performance analysis and design of multiple-user communication systems; emphasizes rigorous formulation and analytical and computational methods; includes queuing networks, decentralized minimum delay routing and dynamic network flow control. *Prerequisite:* CS 338, and either ECE 434 or MATH 366; or consent of instructor. 1 unit.

468. Modeling and Control of Electro-Mechanical Systems

Same as ME 468. Examines fundamental electrical and mechanical laws for derivation of machine models; simplifying transformations of variables in electrical machines; power electronics for motor control; time-scale separation; feedback linearization and nonlinear control as applied to electrical machines. Typical electromechanical applications in actuators, robotics, and variable speed drives. *Prerequisite:* ECE 333, ECE 415, or consent of instructor. 1 unit.

469. Introduction to Coherent Optics and Holography

Same as CS 469. The diffraction transformation of aperture distributions between parallel planes and the imaging and Fourier-transforming properties of lenses; the theory of coherence; the principles of optical and digital holography; and devices and systems for optical data processing. *Prerequisite:* Consent of instructor. 0 or 1 unit.

470. Nonlinear Optics

Light propagation in anisotropic crystals; second- and third-order nonlinear susceptibility and electro-optic effect; and discussion of the relationship of these effects along with such applications as light modulation, harmonic generation, and optical parametric amplification and oscillation. *Prerequisite:* ECE 420. 1 unit.

471. Electromagnetic Waves in Inhomogeneous Media

Electromagnetic waves in layered media; plane wave expansion of electromagnetic point source field; Sommerfeld integrals; transient response; WKB method with asymptotic matching; scattering by junction discontinuity; surface integral equation; volume integral equation; inverse problems. *Prerequisite:* MATH 346 and ECE 420 or PHYCS 442 or equivalent. 1 unit.

472. Quantum Electronics

Brief theoretical introduction to quantum mechanics and atomic physics, with many applications in spin resonance and modern maser theory. *Prerequisite:* PHYCS 383 recommended. 1 unit.

473. Power System Control

Same as CSE 445. Studies energy control center functions, state estimation and steady state security assessment techniques, economic dispatch, optimal power flow, automatic generation control, and dynamic equivalents. *Prerequisite:* ECE 376 or consent of instructor. 1 unit.

476. Power System Dynamics and Stability

Same as CSE 444. Detailed modeling of the synchronous machine and its controls, such as excitation system and turbine-governor dynamics; time-scales and reduced order models; nonlinear and linear multimachine models; stability analysis using energy functions; power system stabilizers. *Prerequisite:* ECE 376 or consent of instructor. Concurrent registration in ECE 415 is recommended. 1 unit.

477. Advanced Antenna Theory

Selected topics from recent engineering literature on antennas supplemented by advanced topics in electromagnetic theory needed for comprehension; current techniques for analysis of wire, slot, horn, frequency independent, quasi-optical, and array antennas. *Prerequisite:* ECE 420. 1 unit.

478. Advanced Electromagnetic Diffraction and Radiation

Asymptotic solutions of Maxwell's equations, geometrical optics, edge diffraction, uniform theories, creeping waves, advanced antenna theory, and topics of current interest. *Prerequisite:* ECE 420 or PHYCS 442; ECE 421 or 477 is recommended for supplemental background. 1 unit.

479. Computational Complexity

Same as CS and MATH 479. Turing machines; determinism and nondeterminism; time and space hierarchy theorems; speed-up and tape compression; Blum axioms; structure of complexity classes NP, P, NL, L, PSPACE; complete

problems; randomness and complexity classes RP, RL, BPP; alternation, polynomial-time hierarchy; circuit complexity, parallel complexity, NC, RNC; relativized computational complexity; time-space trade-offs. *Prerequisite:* CS 373 or 375, or consent of instructor. 4 hours or 1 unit.

480. Optimization by Vector Space Methods

Same as MATH 480. See MATH 480.

482. Physical VLSI Design

Basic physical design requirements for VLSI; performance-oriented formulation and optimization of chip partitioning, module placement and interconnection; optimized design and layout of on-chip modules; circuit extraction; high-speed VLSI circuits; yield and reliability analysis; advanced VLSI packaging and parametric testing. *Prerequisite:* ECE 325 or 382. 1 unit.

484. Reliability Engineering for Integrated Circuits

Description of the algorithms and procedures required to study the reliability of integrated circuit products. Covers reliability modeling, physical causes of semiconductor device failure, reliability model development and calibration, model-based reliability prediction, product testing and measurement, and failure diagnosis. Coverage emphasizes application to integrated circuit technology. *Prerequisite:* ECE 313, 340, or consent of instructor. 1 unit.

488. Electricity Resource Planning

Techniques in electricity resource planning including methodologies for reliability evaluation and assessment, production costing, marginal costing, supply-side and demand-side planning, integrated planning, and planning under competition. *Prerequisite:* MATH 315, ECE 313, and 376; or consent of instructor. 1 unit.

489. Robot Control Theory

Same as GE 489. See GE 489.

490. Seminar in Special Topics

Lectures and discussions on current research and literature on advanced topics in electrical engineering. *Prerequisite:* Advanced standing; consent of instructor. 0 to 1/2 unit. May be repeated for credit.

497. Electrical and Computer Engineering Problems

Lectures and discussions relating to new areas of interest. *Prerequisite:* Consent of instructor. 0 to 1 unit. May be repeated for credit.

498. Individual Study

Individual projects. *Prerequisite:* Consent of instructor. 1/4 to 2 units.

499. Thesis Research

0 to 4 units.

ENGINEERING

Program Administrator: Roscoe L. Pershing
Program Office: 207 Engineering Hall, 1308
 West Green Street, Urbana
Phone: 333-2280

Engineering (ENG)

100. Engineering Lecture

Engineering lecture for freshmen; selected topics each week. *0 hours.* Required of freshmen in the College of Engineering.

101. Cooperative Engineering Education Seminar

Discussion seminar for on campus cooperative education students. Topics include industrial work reports, evaluations of experience, tax and financial aid regulations, and advance enrollment for next work term. *Prerequisite:* Enrollment in the Cooperative ENG Education Program. *0 hours.*

102. Cooperative Engineering Education Practice

Off-campus practice of engineering in government or industry. *Prerequisite:* Cooperative student in any engineering curriculum. *0 hours.*

110. Engineering Apprenticeship

Part-time practice of engineering science in an on-campus research laboratory environment; summary report required. *Prerequisite:* Completion of freshman year or equivalent, and consent of the director of cooperative education and professional practice. *0 hours.* May be repeated.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Engineering Lecture

Required of off-campus transfer students in the College of Engineering. Meets for first three weeks of each semester; selected topics. *0 hours.*

210. Engineering Internship

Full-time practice of engineering science in an off-campus industrial or research laboratory environment; summary report required. *Prerequisite:* Completion of sophomore year or equivalent, or consent of Director of Cooperative Education and Professional Practice. *0 hours.* May be repeated.

298. Executives in the Technological World

Offers a series of seminars by executives from industrial and technical organizations; provides students an opportunity to better understand the role of the technological executive as a decision-maker in the contemporary world; and discusses current trends, practices, economic conditions, productivity, government regulation, and foreign trade from the viewpoint of a wide range of industries such as transportation, steel, energy, and electron-

ics. *Prerequisite:* Junior or senior standing in engineering, or consent of instructor. *1 hour.*

299. Engineering Study Abroad

Provides campus credit for foreign study and/or provides a mechanism for engineering students to maintain continuous enrollment on this campus. If objective is study abroad for credit, a detailed proposal must be submitted by the student for approval by a committee of the department in which the student is studying and the college office prior to such study abroad. Final determination of credit and its application toward the student's degree is made after a review of the student's work abroad by the above committee and the college office. *Prerequisite:* Completion of sophomore year in engineering; approval of student's proposed study program by his department and the college office. *0 to 15 hours (summer session, 0 to 7 1/2 hours).*

ENGINEERING HONORS

Executive Secretary of Program: H. G. Wenzel
Program Office: 207 Engineering Hall, 1308
 West Green Street, Urbana
Phone: 333-2280

Engineering Honors (ENG H)

198. Honors Seminar

Special lecture sequence and/or discussion groups for freshman James Scholars to enable them to explore at their own level various aspects of technology that are of interest to them. *Prerequisite:* Honors student in the University. *1 to 4 hours.*

297. College Honors Seminar

Special lecture sequences and/or discussion groups arranged each semester in special interdisciplinary subjects of current interest for James Scholars in engineering. *Prerequisite:* James Scholar in engineering or consent of instructor. *1 to 4 hours.*

ENGLISH

Head of Department: Dennis E. Baron
Department Office: 208 English Building, 608
 South Wright Street, Urbana
Phone: 333-2391
URL: www.english.uiuc.edu

Includes Business and Technical Writing (B&T W), English (ENGL), and Rhetoric and Composition (RHET)

Business and Technical Writing (B&T W)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

220. Principles of Desktop Publishing and Design

Design and preparation of documents using desktop publishing technology. Students will learn and apply principles governing page design, style sheets, document layout, effective graphics, managing the design process, and usability testing. Students will create a portfolio of design projects, including one major project for a client. *2 hours.*

250. Principles of Business Writing

Teaches students to apply the principles of successful professional communication to business writing tasks. Students will also practice editing and supervising the writing of others. Assignments replicate typical business cases and situations, including a report that requires students to compile and interpret research. *Prerequisite:* Junior standing and completion of campus Composition I requirement. *3 hours.* Credit is not given for both B&T W 250 and either 253, 261, or 263.

253. Business and Administrative Communication

Teaches students to apply the principles of successful professional writing to a range of realistic case problems in routine office communication. Emphasizes flexible problem-solving skills for daily administrative writing tasks. *Prerequisite:* Junior standing and completion of campus Composition I requirement. *3 hours.* Credit is not given for both B&T W 253 and 250, 261, or 263.

261. Technical and Scientific Communication

Teaches students to apply the principles of successful professional writing to a range of realistic cases in technical communication. Emphasizes flexible problem-solving skills and a clear style for communicating technical information to a range of readers. Assignments will include correspondence, instructions, proposals, and a technical report or similar project. *Prerequisite:* Junior standing and completion of campus Composition I requirement. *3 hours.* Credit is not given for both B&T W 261 and 250, 253 or, 263.

263. Writing in the Disciplines and the Professions

Teaches students to apply principles of professional communication to the writing tasks typical of specific disciplines or professions. Assignments will vary, depending on the focus of the course, but will include a substantial report or project. *Prerequisite:* Junior standing and completion of campus Composition I requirement. *3 hours.* Credit is not given for both B&T W 263 and 250, 253, or 261.

271. Persuasive Writing

Same as ADV 288. Students will study principles of persuasion as applied to writing and designing written communications for business and the professions. Included are ads, direct-mail campaigns, argumentative essays, proposals, and other types of writing designed

to move readers to action. *Prerequisite:* Sophomore standing and completion of campus rhetoric requirement. 3 hours.

272. Report Writing

Personal direction in a report writing project which can be integrated with research in another course; study of report-writing principles and practices. Classes meet for the first month after which the student and the instructor arrange a conference schedule. Small group meetings are arranged for presentation of proposals, progress reports, and summary reports. *Prerequisite:* Completion of campus Rhetoric requirement and sophomore standing. 3 hours.

275. Advanced Business and Professional Communication

Teaches students to analyze, execute, and manage complex business writing tasks. Emphasizes practice in managing the writing process and supervising the writing of others. *Prerequisite:* B&T W 253, 261, or 263. 3 hours.

277. Advanced Technical and Scientific Communication

Teaches students to analyze, execute, and manage complex technical writing tasks, with special emphasis on advanced technological solutions to communications problems. *Prerequisite:* B&T W 253, 261, or 263. 3 hours.

290. Individual Study

Independent research with a chosen tutor leading to the writing of a formal report or preparation of some other type of major presentation of information. Enroll in B&T W office, 294 English Building. *Prerequisite:* Consent of instructor. 0 to 3 hours. May be repeated to a maximum of 6 hours.

302. Descriptive English Grammar

Same as ENGL 302. See ENGL 302.

390. Studies in Professional Writing: Special Topics

Study of the forms, situations, and social practices that define writing in particular disciplines or professions. Each class will focus on a specific topic such as science writing, writing in the environmental movement, legal writing, writing in the social sciences, public policy in the popular media, and so on. Assignments will vary with the topic. *Prerequisite:* Junior standing. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

English (ENGL)

101. Introduction to Poetry

Reading and discussion of representative poems of several periods and types. 3 hours.

102. Introduction to the Drama

Reading and discussion of representative plays of several periods and types. 3 hours.

103. Introduction to Fiction

Reading and discussion of representative fiction of several periods and types. *Prerequisite:* For Composition II sections: Completion of Composition I general education requirement. 3 hours.

104. Introduction to Film

Thoughtful viewing of diverse films (in required weekly screenings), along with ample discussion and critical reading and writing, to gain understanding of cinematic expression and of film's capacity to entertain and to exert artistic and social influence. 3 hours.

106. Literature and Experience

Understanding of the relationship between literature and human experience through the study of significant, recurrent themes. 3 hours. May be repeated once as topics vary.

113. The Idea of Comedy

Selective introduction to the theory and practice of comedy; examines a number of influential theories of comedy and a variety of comic forms including poetry, novels, essays, plays, and short stories. 3 hours.

114. The Bible as Literature

Same as RELST 101. See RELST 101.

115. Introduction to English Literature

Study of selected major writings. 3 hours.

116. Introduction to American Literature

Study of selected major writings. 3 hours.

117. Shakespeare on Film and Videotape: From Text to Screen

Same as CINE 117. Close study of a selection of Shakespeare's plays as literary and dramatic texts and as adaptations for cinema and television. 3 hours.

118. Introduction to Shakespeare

Representative readings of Shakespeare's drama and poetry in the context of his age, with emphasis on major plays; selections vary from section to section. Does not fulfill Shakespeare requirement for the English major. 3 hours.

119. The Literature of Fantasy

Same as C LIT 119. Surveys masterworks in the romance tradition from Shakespeare's time to the present; as distinct from science fiction, the materials feature magic and the supernatural rather than technology; and include stage romance, fairy tale, horror tale, and fantasy-novel. Individual works are set in their historical and literary contexts. 3 hours.

120. Science Fiction

Literary and historical study of science fiction from Mary Shelley to Ursula K. LeGuin with particular emphasis on the achievement of science fiction as a literary form in the romance tradition. 3 hours.

123. Jewish Storytelling: From the Russian Shtetl to New York

Same as RELST 131 and YDSH 120. See YDSH 120.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars. *Prerequisite:* Consent of honors adviser. 1 to 3 hours. May be repeated once.

198. Freshman Honors Seminar

Introduction to the study of literature, with emphasis on individual work in fundamental problems of literary analysis; works studied are usually a combination either of short poems and short stories or of novels and plays. *Prerequisite:* James Scholar standing or other designation as a superior student. 4 hours. May be repeated once as topics vary.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

202. Medieval Literature and Culture

Same as C LIT 253. British and continental authors (including Chaucer) read in modern English. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

204. Renaissance Literature and Culture

Same as C LIT 255. Readings in English and continental literary masterpieces with attention to significant cultural influences. 3 hours.

206. Literature and Culture of the Enlightenment

Same as C LIT 257. Readings in English and continental literature of the eighteenth century, with attention to significant cultural influences. 3 hours.

207. Literature and Culture of the Romantic Period

Study of literature, philosophy, visual arts, and social criticism of the British Romantic period, with attention to broader cultural issues. 3 hours.

208. Victorian Literature and Culture

Study of literature, philosophy, visual arts, and social criticism of the British Victorian period, with attention to broader cultural issues. 3 hours.

209. English Literature from the Beginning to 1798

Historical and critical study of selected works of English literature to 1798 in chronological sequence. *Prerequisite:* Completion of the Composition I requirement. 3 hours.

210. English Literature from 1798 to Present

Historical and critical study of selected works of English literature after 1798 in chronological sequence. *Prerequisite:* Completion of the Composition I requirement. 3 hours.

211. Introduction to Modern African Literature

Same as AFRST and C LIT 210. See AFRST 210.

213. The Culture of Modernism

Study of literature, philosophy, visual and performing arts, social criticism, and popular sciences of the Anglo-American Modern period (1880–1920), with attention to broad cultural issues. 3 hours.

215. Practical Criticism

Introduction to applied literary criticism. *Prerequisite:* ENGL 101. 3 hours.

241. The Beginnings of Modern Poetry

American and British poets including Frost, Robinson, Sandburg, Lindsay, Hardy, Hopkins,

Housman, Yeats, Lawrence, the Imagists, and the early Pound and Eliot. 3 hours.

242. Poetry Since 1940
3 hours.

243. Development of the Modern Drama
Same as C LIT 265. Ibsen to O'Neill. 3 hours.

244. Development of the Modern Drama
Same as C LIT 266. Pirandello to the present. 3 hours.

245. The Short Story
Same as C LIT 267. Historical and critical study of the short story (American and European) from the early nineteenth century to World War I; major emphasis on such authors as Hawthorne, James, Crane, Gogol, Chekhov, Maupassant, Flaubert, Joyce, and Mansfield. 3 hours.

246. The Short Story
Same as C LIT 268. Historical and critical study of the short story (American and European) from World War I to the present. Special sections of the course will be devoted to 20th-century American minority culture short stories. 3 hours. May not be repeated.

247. The British Novel
Critical study of representative British novels from different literary periods. 3 hours.

248. Modern British and American Fiction in Relation to Continental Fiction
Same as C LIT 269. Examination of important thematic and structural relationships— influences, parallels, and variations—among selected major works of the nineteenth and twentieth centuries; readings chosen from works of Bronte, Hardy, Lawrence, Woolf, James, Faulkner, Bellow, Oates, Dostoevsky, Tolstoy, Stendhal, Flaubert, Camus, Kafka, Mann, Hesse, Moravia, and Pavese. All works read in English. 3 hours.

250. The American Novel to 1914
Critical study of selected American novels from the late eighteenth century to 1914. 3 hours.

251. The American Novel Since 1914
Critical study of selected American novels from 1914 to the present. 3 hours.

255. Survey of American Literature, I
American literature and its cultural backgrounds to 1870. *Prerequisite:* Completion of the Composition I requirement. 3 hours.

256. Survey of American Literature, II
American literature and its cultural backgrounds after 1870. *Prerequisite:* Completion of the Composition I requirement. 3 hours.

259. Afro-American Literature, I
Same as AFRO 259. Historical and critical study of Afro-American literature in its social and cultural context from the beginning to 1915. 3 hours.

260. Afro-American Literature, II
Same as AFRO 260. Historical and critical study of Afro-American literature in its social and cultural context since 1915. 3 hours.

267. Grimms' Fairy Tales in Their European Context
Same as GER and C LIT 250. See GER 250.

272. Minority Images in United States Film
Same as AFRO 272. Writing-intensive course which explores how a range of films made in the United States have represented diverse ethnicities and cultures in relation to each other and to dominant American media conventions and social ideas. A comparative, case study approach examines racial and gender stereotyping, historical and economic factors, and reactions of various audiences to the films. *Prerequisite:* Fulfillment of the Composition I English requirement; sophomore standing or above. 4 hours.

273. Intermediate Film Studies: Directors, Genres, Themes
Critical study of narrative films, with viewing and discussion of a major film each week; in-depth study of selected directors, genres, and themes; emphasis on aspects of film aesthetics, criticism, and history. *Prerequisite:* ENGL 104 or a college-level course in literature or film. 3 hours.

274. Literature and Society
Major literary works presented within the context of social issues of their time. 3 hours.

275. Literature and Psychology
Psychological and psychoanalytical theories as they bear on the interpretation of literature. 3 hours.

280. Women Writers
Same as W S 280. Study of British and American women authors. 3 hours. May be repeated to a maximum of 6 hours as topics vary.

281. Women in the Literary Imagination
Study of the way various writers, both men and women, have portrayed woman's image, social role, and psychology in English or American literature. 3 hours. May be repeated to a maximum of 6 hours as topics vary.

283. Jewish Sacred Literature
Same as C LIT and RELST 283. See RELST 283.

284. Modern Jewish Literature
Same as C LIT and RELST 284. Surveys imaginative literature by Jewish authors from the Enlightenment to the present, including fiction, poetry, drama, and autobiography written in English or translated from other languages. 3 hours.

285. Postcolonial Literatures in English
Examination of selected postcolonial literature, theory, and film as texts that "write back" to dominant European representations of power, identity, gender and the Other. Postcolonial writers, critics and filmmakers studied may include Franz Fanon, Edward Said, Aime Cesaire, Osmane Sembene, Chinua Achebe, Michelle Cliff, Mahesweta Devi, Buchi Emecheta, Derek Walcott and Marlene Nourbese-Philip. 3 hours.

286. Asian American Literature
Introduction to Asian American literary studies and culture through the reading of major works of literature selected from but not limited to the following American ethnic subgroups: Chinese, Filipino, Japan, Korean, Indian, Pakistani, and Vietnamese. 3 hours.

288. Jewish Literary Responses to the Holocaust
Same as RELST and YDSH 220. See YDSH 220.

290. Individual Study
Study of selected topics. *Prerequisite:* Consent of instructor. 0 to 3 hours. May be repeated to a maximum of 6 hours. Students may register in this course more than once in the same term.

291. Honors Individual Study
Study of selected topics. Restricted to English and English education majors with a 3.25 average who are working towards the degree with distinction in English or in English education. Enrollment in appropriate honors office necessary. 1 to 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

293. Honors Senior Thesis
Independent research with a chosen tutor leading to the writing of a thesis. Restricted to English or English education majors with a 3.25 grade-point average who have satisfied all other requirements towards the degree with distinction; registration in the English Honors Office necessary. 3 hours. (Counts for advanced hours in L A S.)

296. Honors Seminar, I: Themes, Movements, and Forms in British and American Literature
Prerequisite: A 3.25 grade-point average or consent of the chair of the English Honors Committee. Preference to students in the English Honors program and to English concentrators. 3 hours. Offered every semester with varying topics; may be repeated as topics vary. (Counts for advanced hours in L A S.)

297. Honors Seminar, II: Periods in British and American Literature
Prerequisite: A 3.25 grade-point average or consent of the chair of the English Honors Committee. Preference to students in the English Honors program and to English concentrators. 3 hours. Offered every semester with varying topics; may be repeated as topics vary. (Counts for advanced hours in L A S.)

298. Honors Seminar, III: Major British and American Authors
Each seminar considers one or two major authors. *Prerequisite:* A 3.25 grade-point average or consent of the chair of the English Honors Committee. Preference to students in the English Honors program and to English concentrators. 3 hours. May be repeated as topics vary. (Counts for advanced hours in L A S.)

300. Writing About Literature
Writing-intensive, variable topic course designed to improve the student's ability to write clear, well-organized, analytically sound and persuasively argued essays relevant to the discipline of the study of literature. Introduces

students to some strategies of literary criticism and research through examination of critical texts appropriate to its subject. *Prerequisite:* Completion of Campus Composition I general education requirement; one year of college literature or consent of instructor. 3 hours.

301. Introduction to the Study of the English Language

Language theories and modes of language study applied to English. 3 hours or 1 unit.

302. Descriptive English Grammar

Same as B&T W 302. Introduction to the variety and structure of the English language. 3 hours or 1 unit.

303. Historical Introduction to the English Language

Language variation and change from the earliest forms of English to the present day, with emphasis on the rise of Standard English and the social, geographic, and cultural aspects of linguistic change in English. 3 hours or 1 unit.

304. Descriptive English Grammar for ESL Teachers

Same as E I L 302. See E I L 302.

311. Chaucer

A selection read in Middle English. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

315. Poetry and Prose of the English Renaissance, 1500-1600

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

316. The Drama of Shakespeare's Contemporaries

Tudor and Stuart drama. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

318. Shakespeare, I

Earlier tragedies, comedies, and history plays. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

319. Shakespeare, II

Mature tragedies, dark comedies, and late romances. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

321. Poetry and Prose from the Metaphysicals to 1660

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

323. Milton

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

326. Literature of the Restoration and Early Eighteenth Century

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

327. Literature of the Later Eighteenth Century

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

328. English Drama of the Restoration and Eighteenth Century

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

329. Restoration and Eighteenth-Century Fiction

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

331. English Romantic Literature

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

334. Victorian Poetry and Nonfiction Prose

Study of such major poets as Tennyson, Browning, Arnold, and Hardy; and of prose writers including Carlyle, Mill, Arnold, Pater, and Huxley. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

335. Nineteenth-Century British Fiction

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

341. British Literature in the Twentieth Century to 1930

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

342. British Literature in the Twentieth Century Since 1930

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

349. American Literature, 1820 to 1865

Prerequisite: One year of college literature or consent of instructor. 3 hours or 1 unit.

350. American Literature, 1865 to 1914

Prerequisite: One year of college literature or consent of instructor. 3 hours or 1 unit.

351. American Modernist Literature, 1914 to 1945

Prerequisite: One year of college literature or consent of instructor. 3 hours or 1 unit.

352. American Contemporary Literature, 1945 to the Present

Prerequisite: One year of college literature or consent of instructor. 3 hours or 1 unit.

355. Major Authors

Intensive study of the work of one or two major authors. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit. May be repeated as topics vary.

360. The Literature of American Ethnic and Racial Minorities

Prerequisite: One year of college literature or consent of instructor. 3 hours or 1 unit. May be repeated as topics vary to a maximum of 6 hours or 2 units.

361. Topics in English and American Literature

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit. May be repeated as topics vary.

362. Topics in Modern Fiction

Topics including theme, genre, and literary movements, predominantly in English or

American nineteenth- and twentieth-century fiction, with occasional consideration of continental fiction in English translation; topics may vary from semester to semester. *Prerequisite:* One year of college literature or consent of instructor. 3 hours or 1 unit. May be repeated once as topics vary.

365. Comedy

Same as C LIT 365. History and theory of stage comedy. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

366. Topics in Modern Drama

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit. May be repeated as topics vary.

370. Modern African Fiction

Same as AFRST, C LIT, and FR 310. See AFRST 310.

373. Special Topics in Film Studies

Extended investigation of major subjects and issues in narrative film; topics vary and typically include studies of author/directors, genres, historical movements, critical approaches, and themes. *Prerequisite:* One college-level film studies course and one additional college-level course in film studies or literature, or consent of instructor. 3 hours or 1 unit. May be repeated up to 6 hours or 2 units as topics vary.

375. Topics in the Relation of Other Disciplines to the Study of Literature

See *Timetable* for current topics. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit. May be repeated once as topics vary.

381. Theory and Practice of Written Composition

History and theory of written composition; basic rhetorical principles; and guidance and criticism of student writing. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

382. Writing Technologies

Examines the relationship of computer technology to the larger field of writing studies. Topics include a historical overview of computers and other writing technologies; current instructional practices and their relation to various writing theories; research on word processing, computer-mediated communication, and hypermedia; and the computer as a research tool. *Prerequisite:* Junior standing and consent of instructor. 3 hours or 1 unit. Students must have a basic knowledge of word processing.

383. Literary Criticism from 1800 to the Present

Same as C LIT 305. *Prerequisite:* One year of college literature, or consent of instructor. 3 hours or 1 unit.

385. Literature for the High School

Prerequisite: One year of college literature, or consent of instructor. 3 hours or 1 unit.

400. Introduction to Research and Critical Techniques

Introductory course in methods and techniques in research and literary criticism. *1 unit.*

404. Seminar in the English Language

Study of English linguistics. *1 unit.*

405. Writing Studies I: Social Contexts and Functions of Writing

Same as SPCOM 405 and C & I 463. See SPCOM 405.

406. Writing Studies II: Writing Processes and Their Development

Same as SPCOM 406 and C & I 464. See SPCOM 406.

407. Old English

Introduction to the language before 1000 A.D. *1 unit.*

408. Beowulf

Prerequisite: ENGL407 or consent of instructor. *1 unit.*

411. Chaucer

Intensive study of important works by Chaucer with emphasis on *The Canterbury Tales* or *Troilus and Criseyde*. *1 unit.* May be repeated to a maximum of 2 units as topics vary.

414. Seminar in Medieval Literature

Prerequisite: A college course devoted entirely to an aspect of medieval studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

419. Seminar in Shakespeare

Prerequisite: A college course devoted entirely to an aspect of Shakespeare's work, or consent of instructor. *1 unit.* May be repeated as topics vary.

420. Seminar in Sixteenth-Century Literature

Prerequisite: A college course devoted entirely to an aspect of Renaissance studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

424. Seminar in Seventeenth-Century Literature

Prerequisite: A college course devoted entirely to an aspect of Renaissance studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

427. Seminar in Restoration and Eighteenth-Century Literature

Prerequisite: A college course devoted entirely to an aspect of eighteenth-century studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

433. Seminar in Romantic Literature

Prerequisite: A college course devoted entirely to an aspect of Romantic studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

437. Seminar in Victorian Literature

Prerequisite: A college course devoted entirely to an aspect of Victorian studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

443. Seminar in Modern British Literature

Prerequisite: One college course devoted entirely to an aspect of modern British studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

447. Seminar in Earlier American Literature

Prerequisite: One college course devoted entirely to an aspect of American studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

453. Seminar in Later American Literature

Prerequisite: One college course devoted entirely to an aspect of American studies, or consent of instructor. *1 unit.* May be repeated as topics vary.

459. Seminar in African-American Literature

Prerequisite: One college course devoted entirely to an aspect of American literature, or consent of instructor. *1 unit.* May be repeated in the same semester as topics vary to a maximum of 2 units; and may be repeated in separate semesters to a maximum of 5 units.

463. Seminar in Literary Themes and Movements

Prerequisite: One year of graduate study of literature, or consent of instructor. *1 unit.* May be repeated as topics vary.

464. Seminar in Literary Modes and Genres

Prerequisite: One year of graduate study of literature, or consent of instructor. *1 unit.* May be repeated as topics vary.

478. Seminar in the Relation of Other Disciplines to the Study of Literature

Prerequisite: One year of graduate study of literature, or consent of instructor. *1 unit.* May be repeated as topics vary.

481. Seminar in Literary Theory and Criticism

Prerequisite: A college course devoted entirely to criticism, or consent of instructor. *1 unit.* May be repeated as topics vary.

482. Topics in Research, Inquiry, and Writing Studies

Same as C & I 465. Focuses on the diverse research paradigms that are often employed in the study of writing processes. Topics will vary each term. Examines past and current writing research in the topic area with an emphasis on the critical examination of research designs and the influence of epistemologies on the interpretation of data. *Prerequisite:* Graduate standing in writing studies or consent of instructor. *1 unit.* May be repeated to a maximum of 2 units.

483. Topics in Writing Pedagogy and Program Design

Same as C & I 466. Examines the relationships among writing studies, theories of pedagogy, and the practice of the writing teacher and administrator. Also focuses on particular problems or particular schools of thought. Typical topics include Writing Program Design and Administration; Writing, Thinking, and Problem Solving; The Classroom as a Research Site;

Collaborative Learning; and Writing Across the Curriculum and Discourse Communities. Requirements will vary with instructors and topics. *Prerequisite:* Graduate standing in writing studies or consent of instructor. *1 unit.* May be repeated to a maximum of 2 units.

484. Topics in Discourse and Writing Studies

Same as C & I 469. Focuses on the modes of inquiry central to writing research. The course topic will vary each term and may address such issues as cognitive research and writing, ethnographic research and writing, and discourse analysis and writing. *Prerequisite:* Graduate standing in writing studies or consent of instructor. *1 unit.* May be repeated to a maximum of 2 units.

491. Research in Special Topics

Independent study under the guidance of a member of the graduate faculty. *1 unit.* May be repeated to a maximum of 2 units.

492. Master's Area Examination Tutorial

Reading for the Master's Area Examination under the guidance of the candidate's graduate adviser. *6 or 12 hours.* May be taken once for 12 hours or twice for 6 hours each. No graduate credit.

493. Professional Seminar in the Teaching of College English

Prerequisite: Graduate standing in the Department of English or consent of instructor. *0 or 1 unit.* May be repeated by Ph.D. candidates as the topics vary but without credit after two units have been earned in this course. Students needing the proseminar for their programs will be given priority enrollment.

499. Thesis Research

Guidance in writing theses for doctoral degrees. *Prerequisite:* Doctoral candidate standing. *0 to 4 units.*

Rhetoric and Composition (RHET)

100. Rhetoric Tutorial

Tutoring in writing skills to be scheduled by individual tutors. Open only to students placed in and registered for RHET 101 or 102. *Prerequisite:* Concurrent registration in RHET 101 or 102. *1 hour.* May be repeated to a maximum of 2 hours.

101. College Writing, I

Instruction in structuring argumentative essays: concentrates on creating problem statements, making points, and providing evidence in academic essays. This course is the first semester of a two-semester sequence (RHET 100-101-102) that fulfills the campus Composition I general education requirement. *Prerequisite:* Concurrent registration in RHET 100; placement in RHET 101. *3 hours.* Credit is not given for both RHET 101 and 103.

102. College Writing, II

Continued instruction in structuring argumentative essays: concentrates on evidence, claims, warrants, issues, discussion, and elements of style. Second semester of a two-semester sequence (RHET 100-101-102) that ful-

fills the campus Composition I general education requirement. *Prerequisite:* RHET 101; concurrent registration in RHET 100. 3 hours. Credit is not given for RHET 102 and either RHET 104 or RHET 105.

103. College Composition, I

Instruction in structuring argumentative essays: concentrates on creating problem statements, making points, and providing evidence in academic essays. This is the first semester of a two-semester sequence (RHET 103-104) that satisfies the campus Composition I general education requirement. *Prerequisite:* Placement in RHET 103. 3 hours. Credit is not given for both RHET 103 and RHET 101.

104. College Composition, II

Continued instruction in structuring argumentative essays: concentrates on evidence, claims, warrants, issues, discussion, and elements of style. This is the second semester of a two-semester sequence (RHET 103-104) that satisfies the campus Composition I general education requirement. *Prerequisite:* RHET 103. 3 hours. Credit is not given for both RHET 104 and RHET 102 and RHET 105.

105. Principles of Composition

Study of the methods of exposition, the problems of argument, the use of evidence, and style; practice in expository writing. This course fulfills the Campus Composition I general education requirement. 4 hours. Credit is not given for RHET 105 and either RHET 102, RHET 104, RHET 108 or SPCOM 111 and 112.

108. Forms of Composition

Study of the methods of exposition, the problems of argument, the use of evidence, and style; practice in expository writing. This course fulfills the Campus Composition I general education requirement. 4 hours. Students with credit in RHET 108 may not receive additional credit for RHET 105 or SPCOM 111 and 112.

133. Principles of Composition

Intermediate level. Practice in exposition, with emphasis on organization, paragraphing, and sentence structure. For the student whose career will require competence in writing clear, precise prose as an adjunct to another professional activity. *Prerequisite:* Completion of campus Composition I general education requirement 3 hours. Credit is not given for both RHET 133 and RHET 143.

143. Intermediate Expository Writing

Practice in expository types, with emphasis on style and critical analysis. Recommended for rhetoric majors. *Prerequisite:* Completion of campus Composition I general education requirement 3 hours. Credit is not given for RHET 143 and RHET 133.

144. Introductory Narrative Writing

Practice in the writing of narrative prose, with primary emphasis on short fiction. *Prerequisite:* Completion of campus Composition I general education requirement. 3 hours.

146. Introductory Poetry Writing

Practice in the writing of poetry; experimentation with a number of fixed forms and free

verse, but emphasis mainly on the student's freedom to develop a personal style. *Prerequisite:* Completion of Composition I general education requirement. Student must petition the Director of Creative Writing to take this course concurrently with RHET 144, 204, or 304. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

202. Communications Workshop

Independent writing projects and examination of literature as the cultural basis of the student's specialized fields. 3 hours.

204. Intermediate Narrative Writing

Practice in the writing of fiction, with emphasis on the short story. *Prerequisite:* RHET 144 or equivalent. 3 hours.

227. Advanced Expository Writing

Types of nonfiction prose, including the essay, criticism, biography, and historical writing. *Prerequisite:* RHET 133 or 143, or equivalent, or consent of instructor. 3 hours.

304. Advanced Narrative Writing

Continued practice in the writing of fiction, with emphasis on the longer story. *Prerequisite:* RHET 204 or equivalent. 3 hours or 1 unit.

306. Advanced Poetry Writing

Practice of the writing of poetry aided by intensive study of examples. *Prerequisite:* RHET 146 or equivalent. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

355. Creative Writing Tutorial

Personal direction in a writing project: fiction (novel or short stories), poetry, criticism, narrative, etc. Frequency of conference to be determined by the type of project. *Prerequisite:* RHET 227, 304, or 306 and consent of the Director of Creative Writing. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units. Undergraduate Rhetoric and Composition majors with a 3.25 average who are working towards the degree with Distinction or High Distinction in Rhetoric and Composition may, with the consent of the Director of Creative Writing and the English honors adviser, take this course for honors credit.

400. Problems in Fiction Writing

Examination of the creative process of fiction from the perspectives of aesthetics and techniques, illustrated from the work of selected authors. *Prerequisite:* Graduate standing in English. 1 unit.

402. Problems in Poetry Writing

Examination of the creative process of poetry from the perspective of aesthetics and techniques, illustrated from the work of selected authors. *Prerequisite:* Graduate standing in English. 1 unit.

404. Writing Workshop in Fiction

Directed individual projects, with group discussion in fiction. *Prerequisite:* Admission to the MFA program, or graduate standing in English with advanced submission of creative work and consent of instructor. 1 unit. May

be repeated in subsequent semesters to a maximum of 4 units.

406. Writing Workshop in Poetry

Directed individual projects, with group discussion in poetry. *Prerequisite:* Admission to the MFA program, or graduate standing in English with advanced submission of creative work and consent of instructor. 1 unit. May be repeated in subsequent semesters to a maximum of 4 units.

ENGLISH AS AN INTERNATIONAL LANGUAGE

Director: Lawrence F. Bouton

Division Office: 3070 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 333-1506

URL: www.deil.lang.uiuc.edu/deil

Includes English as a Second Language (E S L) and English as an International Language (E I L)

English as a Second Language (E S L)

110. English Pronunciation for Academic Purposes

Designed to improve the international student's ability to speak and understand English at normal conversational speed and to give the student the ability to continue improving pronunciation skills after the course is finished. Focus on the rhythm, stress, intonation, and sounds of natural speech, and the use of ordinary English spelling to guide the pronunciation of newly encountered words. *Prerequisite:* Recommendation from UIUC English as a Second Language Placement Test. 3 hours; summer session, 0 to 4 hours. Student must be an undergraduate to receive credit. Students should consult their college concerning use of credit from this course toward graduation.

113. English Structure and Paragraph Development for Undergraduate Students

Introduction to the process of writing; fundamentals of paragraph development; development of oral skills. *Prerequisite:* Recommendation from UIUC English as a Second Language Placement Test. 3 hours. Students should consult their college concerning use of credit from this course toward graduation.

114. Introduction to Academic Writing for Undergraduate Students

Review of the fundamentals of paragraph writing and introduction to the multiparagraph essay; instruction on basics of library research. *Prerequisite:* E S L 113 or recommendation from UIUC English as a Second Language Placement Test. 3 hours. The E S L 114/115 sequence fulfills the campus Composition I requirement for non-native speakers of English.

115. Principles of Academic Writing for Undergraduate Students

Introduction to the research paper, including a variety of writing and skill-building tasks; development of peer and self-editing skills. *Prerequisite:* E S L 114 or equivalent, recommendation from UIUC English as a Second Language Placement Test. 3 hours. The E S L 114/115 sequence fulfills the campus Composition 1 requirement for non-native speakers of English.

400. English for Oral and Written Communication for International Graduate Students

Introduction to the conventions of group discussions and formal oral presentations; introduction to paragraph development and organization of American academic writing. *Prerequisite:* Recommendation from UIUC English as a Second Language Placement Test. 0 to 4 hours. No graduate credit.

401. Introduction to Academic Writing for International Graduate Students

Introduction to the use of rhetorical modes typical of academic writing; introduction to the research paper; review of strategies for effective and critical reading. *Prerequisite:* E S L 400, or recommendation from UIUC English as a Second Language Placement Test. 0 to 4 hours. No graduate credit.

402. Advanced Academic Writing for International Graduate Students, I

Integration of the four skills of reading, writing, listening, and speaking; special focus on advanced academic writing at the graduate level, including writing such as proposals, research reports, theses, as appropriate; review of principles of writing including writing from sources. *Prerequisite:* E S L 401, or recommendation from UIUC English as a Second Language Placement Test. 0 to 4 hours. No graduate credit.

403. Advanced Academic Writing for International Graduate Students, II

Continuation of E S L 402 with emphasis on seminar presentation and thesis and dissertation-related skills. *Prerequisite:* E S L 402. 0 to 4 hours. No graduate credit.

404. English Pronunciation for International Teaching Assistants

Sounds, rhythm, and melody of spoken English for current and potential international teaching assistants who are required to teach in English. Includes word and phrase level study; special emphasis on the pronunciation of English vocabulary in students' own academic disciplines. *Prerequisite:* Placement based upon SPEAK or UIUC English as a Second Language Placement Test score. 0 units.

405. Business Communications for Graduate International Students

Course seeks to improve student's English usage for both professional and academic purposes. Skills covered include business letter writing, writing of resumes, research paper writing, formal oral presentations, and informal discussion with special focus on the needs of non-native English speakers. 4 hours.

406. Oral Communication for International Teaching Assistants

Focuses on use of English at the discourse level, with videotaping and critique of student presentation and development of teaching strategies related to university classroom and laboratory contexts. *Prerequisite:* Consent of instructor. 0 units.

410. English Pronunciation for Academic Purposes

Designed to improve the international student's ability to speak and understand English at normal conversational speed and to give the student the ability to continue improving pronunciation skills after the course is finished. Focus on the rhythm, stress, intonation, and sounds of natural speech, and the use of ordinary English spelling to guide the pronunciation of newly encountered words. *Prerequisite:* Recommendation of UIUC English as a Second Language Placement Test. 0 to 4 hours. No graduate credit.

English as an International Language (E I L)**199. Undergraduate Open Seminar**

1 to 5 hours. May be repeated.

214. E S L in the Elementary School

On-site practical experience in an elementary school, involving at least 100 hours of classroom observations, consultations, teaching, tutoring, and assisting, to acquaint students with the many facets of E S L/bilingual education in a public school setting. Hours to be arranged with the cooperating teacher. Satisfies one requirement for those who wish to obtain an Illinois E S L endorsement on an Illinois teaching certificate. 2 hours.

215. ESL in the Secondary School

On-site practical experience in a secondary school, involving at least 100 hours of classroom observations, consultations, teaching, tutoring, and assisting, to acquaint students with the many facets of E S L/bilingual education in a public school setting. Hours to be arranged with the cooperating teacher. Satisfies one requirement for those who wish to obtain an Illinois E S L endorsement on an Illinois teaching certificate. 2 hours.

301. Topics in Applied TESL/TEFL Theory

Implications of TESL/TEFL theory and research for classroom practice; preparation of teaching and testing materials; evaluation of materials on the basis of E S L/EFL teaching experiences; adaptation to needs of different learner ages, language, and achievement backgrounds; and new teaching formats. *Prerequisite:* Consent of instructor. 2 to 4 hours, or ½ to 1 unit. May be repeated as topics vary to a maximum of 8 hours or 2 units.

302. Descriptive English Grammar for E S L Teachers

Same as ENGL 304. Adaptation of modern English grammar to meet the needs of the ESL/EFL teacher, with special emphasis on the development of knowledge and skills that can be used in the analysis of the syntax, lexis and pragmatics of English. 3 hours or 1 unit.

305. Introduction to Applied Linguistics

Same as LING 305. See LING 305.

311. ESL Methods and Materials

Survey and demonstration of all major E S L teaching methods and techniques; an examination of criteria for evaluating and selecting E S L/learning materials for a variety of skills at the beginning level; and an introduction to E S L curriculum and syllabus design. *Prerequisite:* Consent of instructor. 3 hours or 1 unit.

312. ESL for Beginning-Level Adult Learners

Practical experience teaching E S L (grammar, listening, speaking, and pronunciation) to beginning-level adult learners. Includes opportunities to observe master teachers demonstrate teaching methods and techniques, to prepare and adapt materials, to teach the materials in classroom and tutorial teaching situations, and to discuss the relationship between teaching theory and practice. *Prerequisite:* Credit or concurrent registration in E I L 311 and 388. 2 hours or ½ unit.

335. Neurolinguistics and Second Language Learning

Same as LING 335. Introduces theoretical, methodological and applied research on the relationship between neurolinguistics and second language acquisition with special emphasis on the "bilingual brain." *Prerequisite:* One of LING 200, 225, 300, or 400; or consent of instructor. 3 hours or 1 unit.

345. Reading and Writing in a Second Language

Examines current research on learning to read and to write in a second language and practical applications for second language pedagogy drawn therefrom. Coverage is distributed equally between reading and writing. In addition to two hour exams, participants will complete an original project related to either of the two main topics. This may either take the form of designing an original research study or preparing pedagogical materials based on current research findings. Participants will also review a recent commercial textbook or set of materials designed to teach either reading or writing in a second language. *Prerequisite:* E I L 302 or consent of instructor; E I L 389. 3 hours or 1 unit. May be taken concurrently with E I L 389 with consent of instructor.

350. Introduction to Sociolinguistics

Same as LING 350. See LING 350.

356. Impact of Cultural Differences in TESL

Examines people as cultural beings; studies the effect of cultural differences on communication, both in the E S L classroom and in the community; and presents various methods of incorporating relevant elements of American culture into the E S L classroom. 3 hours or 1 unit.

360. Principles of Language Testing

Same as FR, GER, ITAL, PORT, and SPAN 360. Studies theoretical and practical aspects of language testing. Examines purposes and types of language tests in relation to theories

of language use and language teaching goals; discusses testing practices and procedures related to language teaching and language research; and includes the planning, writing, and administration of tests, basic descriptive statistics, and test analysis. A project is required. *Prerequisite:* E I L 389. 3 hours or 1 unit.

367. Communicative Approaches to Second and Foreign Language Teaching

Introduces students to current issues in the theory and practice of communicative language teaching. Discusses the notion that communication is a social event from three perspectives: theoretical linguistics; applied linguistics; and classroom teaching. Specific questions addressed range from a consideration of the nature of applied linguistics to issues related to student autonomy. 3 hours or 1 unit.

380. Classroom Language Acquisition

Same as FR, GER, ITAL, PORT, and SPAN 380. See SPAN 380.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, FR, GER, HUMAN, ITAL, PORT, SLAV, and SPAN 382, and LING 386. See HUMAN 382.

388. English Phonology and Morphology for ESL Teachers

Same as LING 388. Applications of linguistics to language learning with special emphasis on learning the sound system of English. *Prerequisite:* Two years of a foreign language or equivalent; consent of instructor. 3 hours or 1 unit.

389. Theoretical Foundations of Second Language Acquisition

Same as FR 381, and GER, ITAL, LING, PORT, and SPAN 389. Exploration of the relationship between second language acquisition (SLA) theory and research, and classroom language learning and teaching. *Prerequisite:* An introductory course in linguistics or consent of instructor. 3 hours or 1 unit.

402. Introduction to General Linguistics

Same as ANTH and LING 400. See LING 400.

410. Generative Phonology in English Teaching

Generative phonological analyses of English and the teaching of English pronunciation: reevaluation of teaching goals, content, presentation, and methodology; required projects involve research into English phonology leading to the development and evaluation of lesson materials for E S L classes. *Prerequisite:* E I L 311, 312, and 388. 1 unit.

412. Pedagogical Grammar

Same as LING 413. Surveys English grammar and texts for teaching grammar in E S L with special emphasis on the development of skills in explanation of grammatical phenomena in E I L classes. *Prerequisite:* Consent of instructor. 1 unit.

415. Topics in Applied Linguistics

Same as LING 415. See LING 415.

435. Seminar in Neurolinguistics and Second Language Learning

Research-oriented seminar in neurolinguistics of second-language learning; students conduct supervised research projects on topics including bilingual speech perception, cerebral laterality, age-related effects upon L2 learning, and aphasia in bilinguals and multilinguals; consult *Timetable* for specific topics. *Prerequisite:* E I L 335. 1 unit.

456. Pragmatics and Cross-cultural Communication

Same as ITAL, PORT, and SPAN 487. Focuses on ways the context of an interaction and cultural background of the participants affect the language they use and the interpretation that they give to what they hear. Topics include speech acts, direct and indirect speech, politeness theory, turn taking, and backchannel feedback—first in American English, then in relation to other languages represented in the classroom. Attention is given to how differences in the cultural background of participants in an interaction can lead to pragmatic failure and what can be done in the language classroom to prevent such failure. Various research methods are investigated. *Prerequisite:* E I L 350, 356 or LING 350. ½ or 1 unit.

460. Research Methods in Language Learning

Seminar focusing on the formulation of language learning and teaching issues as research questions. Specific topics include: types of research problems, research designs, methods, and strategies; and the analysis, interpretation, and reporting of research findings. Discusses illustrative research and evaluation studies. Students participate in seminar presentations and develop a research proposal. *Prerequisite:* E I L 389. 1 unit.

463. College Teaching of Foreign Languages

Same as FR, GER, ITAL, PORT, RUSS, and SPAN 463. See FR 463.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as FR, GER, ITAL, PORT, RUSS, and SPAN 481. See FR 481.

487. Seminar in the Teaching of English as a Second Language

Discussion of and research into various topics of current interest to persons involved in teaching English as a second language; emphasis on new approaches to problems facing the field and the development of understanding methods; study of materials leading to possible solutions. *Prerequisite:* E I L 388 or 302, or consent of instructor. ½ to 1 unit. May be repeated as topics vary.

491. Research in Special Topics

Independent study under guidance of a member of the graduate faculty. *Prerequisite:* Consent of instructor. ¼ to 1 unit. May be repeated to a maximum of 2 units.

499. Thesis Research

Individual direction of research and thesis writing. *Prerequisite:* Consent of thesis super-

visor. 0 to 2 units. May be repeated to a maximum of 2 units.

ENGLISH AS A SECOND LANGUAGE

(See English as an International Language)

ENTOMOLOGY

Head of Department: May R. Berenbaum
Department Office: 320 Morrill Hall, 505 South Goodwin Avenue, Urbana
Phone: 333-2910
URL: www.life.uiuc.edu/Entomology/home.html

Entomology (ENTOM)

105. Insects and People

Same as BIOL 105. Fundamentals of insect biology as reflected in human culture; insect physiology, ecology, and behavior discussed in the context of art, literature, movies, medicine, sports, law, and history. 3 or 4 hours. Optional two-hour laboratory for 1 hour additional credit.

120. Introduction to Applied Entomology

Same as CPSC and NRES 120. See CPSC 120.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

280. The Insects of Forest and Landscape Trees, Shrubs, and Flowers

Same as NRES 290. See NRES 290.

290. Special Problems

For students ready to undertake a special investigation to be completed as an undergraduate study or as the beginning of a thesis problem for an advanced degree. It also may be used to prepare a thesis for honors at graduation. *Prerequisite:* Consent of instructor. 1 to 5 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in this option.

301. Introduction to Entomology

Integrated studies of the principal morphological, physiological, ecological and behavioral relationships among insects. Lecture and laboratory. *Prerequisite:* BIOL 122 and CHEM 231. 3 to 5 hours, or ¾ to 1 unit. Term papers, field experience, and/or insect collections will be required for 4 or 5 hours, or 1 unit credit.

302. Classification and Evolutionary History of Insects

Analytical survey of the classification and evolution of the orders and principal families of insects, with practical experience in the identification of insects at these taxonomic levels; field trips required. Lecture and laboratory. *Prerequisite:* ENTOM 301 or consent of instructor. 4 hours or 1 unit.

304. Genomic Analysis of Insects

Comprehensive and integrated presentation of insect genomic analysis from the molecular level to that of the population; concepts are applied to certain aspects of insect population regulation. *Prerequisite:* BIOL 122 or 210, and BIOL 371, and BIOCH 350, or equivalents; or consent of instructor. 3 hours or ¾ unit.

310. Insect Physiology

Study of the principal physiological and biochemical functions of insects. Lecture and laboratory. *Prerequisite:* ENTOM 301 or equivalent, organic chemistry, and consent of instructor. 4 hours or 1 unit.

313. Biology of Disease Vectors

Examines the major groups of arthropods and associated pathogens that affect the health and well-being of humans and other animals. Training will include identification, classification, methods of injury, habits, vector competence, and control of insects, ticks and mites that are predators, parasites, or vectors of disease. The course will examine and use both classical and molecular technologies to address epidemiological, ecological, and diagnostic factors associated with arthropod-borne diseases. *Prerequisite:* One year college biology, ENTOM 301 or equivalent, and consent of instructor. 4 hours or 1 unit. Graduate students required to write a term paper.

315. Insect Ecology

Discussion of the practical and theoretical aspects of ecology in relation to insects as individuals, populations, and communities; emphasis on the role of insects in the environment. *Prerequisite:* EEE 212 or consent of instructor. 3 or 5 hours, or ¾ or 1 unit. (Lecture only, 3 hours or ¾ unit; with laboratory, 5 hours or 1 unit.).

319. Fundamentals of Insect Pest Management

Same as CPSC 329. Study of the principles underlying the control of important insect pests of agriculture and of human and animal health; emphasis on integrated pest management involving a systems approach which combines biological, cultural, and chemical suppressive factors into ecologically sound and socially and economically acceptable technology. Lecture and laboratory. *Prerequisite:* ENTOM 120, or 301 and 302, or consent of department. 4 hours or 1 unit.

320. Insect Pathology

Examines the general principles of pathology as they apply to insects; includes non-infectious and infectious diseases caused by viruses, bacteria, fungi, protozoa, and nematodes. Studies the epizootiology of naturally occurring insect disease and the use of insect pathogens as microbial control agents. Lecture

and laboratory. *Prerequisite:* ENTOM 319 and MCBIO 200 or equivalent. 4 hours or 1 unit.

321. Biological Control of Insect Pests

Same as CPSC 321. Examines the use of biological methods for the control of insect pests; emphasizes the use of natural enemies in control programs; and discusses life history characteristics of parasitoids and predators, ecological principles of population regulation, techniques and protocols in implementation of control programs and related topics. *Prerequisite:* ENTOM 315 or 319, or consent of instructor. 2 hours or ½ unit.

426. Seminar in Entomology

Discussions, reviews, and appraisals of special topics in the field of entomology. *Prerequisite:* Consent of instructor. 0 or ¼ unit. May be repeated to a maximum of 1 unit.

490. Individual Topics

Individual topics in research and/or reading conducted under the supervision of faculty members in the Department of Entomology; particularly designed for students enrolled in the entomology program who would like to become more familiar with specialized fields of study prior to committing themselves to a specific area for their advanced degrees. *Prerequisite:* Consent of instructor. ¼ to 2 units. May be repeated.

499. Thesis Research

Work may be taken in the following subjects: insect genetics; insect behavior; applied entomology; systematic entomology; biology and ecology of insects; and insect physiology. 0 to 4 units.

ENVIRONMENTAL STUDIES

Interim Director of the Environmental Council:
John B. Braden
Council Office: 350 Environmental & Agricultural Sciences Building, 1101 West Peabody Drive, Urbana
Phone: 333-4178
URL: www.environ.uiuc.edu

Environmental Studies (ENVST)

160. Comparative Environmental History: People, Crops, and Capital

Same as HIST 160. See HIST 160.

210. Economics of the Environment

Same as ACE, ECON, NRES and U P 210. See ACE 210.

236. Tomorrow's Environment

Same as CHLTH 266 and CPSC 236. See CPSC 236.

241. Introduction to Radiation Protection

Same as NUC E 241. See NUC E 241.

250. Seminar in Environmental Studies.

Seminar exposing students in the Environmental Fellows Program to different disciplinary perspectives on specific environmental issues, as revealed in the scholarly literature. Specific problems will vary from semester to semester. This seminar helps students make the transition from disciplinary to interdisciplinary thinking. Team-taught. *Prerequisite:* Admission to Environmental Fellows Program or consent of EFP Director. 2 hours.

273. Presenting Environmental Information

Same as AGCOM and NRES 273. See AGCOM 273.

275. Environmental Communications

Same as AGCOM and NRES 275. See AGCOM 275.

283. Introductory Ecology for Educators

Same as CPSC and NRES 223. See NRES 223.

298. Special Topics in Environmental Studies

Lectures in topics of current interest. See *Time-table* for current topics. *Prerequisite:* Varied, depending on topic, and/or consent of instructor. 1 to 4 hours. May be repeated.

317. Natural Resources Economics

Same as ACE and NRES 310. See ACE 310.

320. Conservation Biology

Same as CPSC 320 and EEE 349. See EEE 349.

331. Toxic Substances in the Environment

Same as CHLTH 361 and CPSC 331. Explores toxicological, environmental, public health, occupational and ecological aspects of the use and release of toxic substances in the environment; features case histories of environmental contamination that illustrate ecological, health, and social aspects of pollution; emphasizes biochemical mechanisms and ecosystem consequences. *Prerequisite:* One year of college chemistry or one year of college biology or consent of instructor. 3 hours or ¾ unit.

332. Genetic Toxicology

Same as CPSC and MCBIO 332. See CPSC 332.

333. Pesticide Toxicology

Same as V B 333. Examines the biological effects of major classes of insecticides and herbicides, and of selected individual fungicides, including: toxicity to nontarget organisms, persistence and fate in the environment, biotransformation, and ecological consequences. Current regulations on pesticide testing will also be presented. The mechanism of action on target species will be discussed only in relation to effects on nontarget organisms. *Prerequisite:* One year of college chemistry and one year of college biology, or consent of instructor. 3 hours or 1 unit.

341. Regional Environmental Management Simulation

Same as ACES 319, CEE and GEOG 341 and U P 375. See CEE 341.

344. Social Impact Assessment

Same as L A, LEIST, NRES, R SOC and U P 344. See LEIST 344.

345. Communication in Environmental Social Movements
Same as AGCOM 348, SOC 345 and NRES 358.
See AGCOM 348.

347. Environmental Sociology
Same as R SOC and SOC 347. See SOC 347.

348. Atmospheric Chemistry
Same as CEE 348. See CEE 348.

349. Basic Toxicology
Same as CPSC and V B 349 and FSHN 380.
See FSHN 380.

350. Environmental Studies Workshop.
Team-taught workshop in which students and faculty work together in teams to analyze a particular environmental problem and develop potential solutions. The course will focus on a selected environmental problem and seek solutions through integration of the humanities and the social, physical and biological sciences. The integrated approach will be compared to the process of framing the problem from the perspective of the individual disciplines, evaluating the assumptions inherent in each approach. This workshop is part of the capstone experience for students in the Environmental Fellow Program. *Prerequisite:* Admission to Environmental Fellows Program or consent of the EFP Director. 4 hours.

351. Environmental Organic Chemistry
Same as NRES 351. See NRES 351.

360. Landscapes and Texts: Comparative Approaches to Environmental History
Same as HIST 360. See HIST 360.

369. Environmental Health
Same as CHLTH 369. See CHLTH 369.

374. Principles of Epidemiology
Same as CHLTH, MED S and VP 374. See CHLTH 374.

380. Current Problems in Environmental Geology
Same as GEOL 380. See GEOL 380.

414. Neurotoxicology
Same as PSYCH and V B 414. See V B 414.

416. Developmental Toxicology
Same as V B 416. Introduction to developmental toxicology that examines causes and manifestations both of structural malformations and of functional deficits in mammals. Topics covered include interactions between external factors and developmental gene expression, the behavioral consequences of chemical exposure, identification and regulation of developmental toxicants. Examples emphasize developmental toxicants that are present in the human environment. Laboratory demonstrations will illustrate lecture material whenever feasible. *Prerequisite:* ENVST 349, or one course in neurobiology or consent of instructor. ¼ unit.

427. Statistical Techniques in Epidemiological Research
Same as CHLTH 427, MED S 463 and VP 426.
See CHLTH 427.

440. Public Involvement in Resource Management and Environmental Planning
Same as L A, LEIST, NRES, R SOC and U P 440. See NRES 440.

449. Techniques and Instrumentation in Air Sampling
Same as CEE 449 and M E 412. See CEE 449.

463. Natural Resource Economics
Same as ACES 410, ECON and NRES 463. See ACES 410.

464. Environmental Economics: Theory and Applications
Same as ACES 411 and ECON 464. See ECON 464.

496. Interdisciplinary Toxicology Seminar
Same as V B and VP 496. See VP 496.

FINANCE

Chairperson of Department: Morgan J. Lyng
Department Office: 340 Commerce Building (West), 1206 South Sixth Street, Champaign
Phone: 244-2239
URL: www.cba.uiuc.edu/finance

Finance (FIN)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

254. Corporate Finance
Introductory study of corporate financial management, in particular how the financial manager's choices add value to shareholder wealth through investment financing and operating decisions. *Prerequisite:* Credit or concurrent registration in ACCY 202 and ECON 173. 3 hours. (Counts for advanced hours in L A S.)

260. Introduction to Insurance
Introductory course on the role of insurance in society; covers insurance terminology, common personal insurance policies (auto, health, life and homeowners) and current issues. 3 hours.

262. Wealth Management and Life Insurance
Studies personal wealth management techniques with an emphasis on life insurance products; covers life insurance policies, annuities, trusts, buy-sell arrangements, investing in stocks, bonds and mutual funds, banking and borrowing, purchasing residential and commercial real estate, income and estate taxation and management of personal financial portfolio. 3 hours.

264. Fundamentals of Real Estate
Survey of real estate finance, appraisal, investment, law, brokerage, management, development and economics. Special attention is given to the analysis of aggregate real estate

and mortgage markets, to the individual transactions within these markets, and to the legal and institutional factors which affect these markets. *Prerequisite:* ECON 102. 3 hours.

294. Senior Research
Research and reading course for students concentrating in finance, insurance, urban land economics, or related areas who meet one of the following requirements: (1) have a cumulative grade-point average of 3.0 or better; (2) have attained Honors Day recognition in the junior year; or (3) have consent of instructor. May be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Senior standing. 2 to 4 hours. (Counts for advanced hours in L A S.)

295. Senior Research
Research and reading course for students concentrating in finance, insurance, urban land economics, or related areas. May be taken by students in the college honors program in partial fulfillment of the honors requirements. *Prerequisite:* Senior standing; and cumulative grade-point average of 3.0 or better, Honors Day recognition in the junior year, or consent of instructor. 2 to 4 hours. (Counts for advanced hours in L A S.)

300. Financial Markets
Theory and applications associated with the functioning of financial markets to include the conceptual foundations of portfolio theory, risk management, and asset valuation. The stock, money, bond, mortgage, and futures and options markets are examined. *Prerequisite:* FIN 254; C S 105 or demonstration of electronic spreadsheet competency. 3 hours or ¾ unit.

301. Financial Intermediaries
Surveys the structure and activities of financial intermediaries; asset-liability management; the effects of government regulation on financial institutions; central banking and the tools of monetary policy. *Prerequisite:* FIN 300, or consent of instructor. 3 hours or ¾ unit.

321. Advanced Corporate Finance
Theories of firms' investment and financing decisions are covered. Topics include dividend policy, capital budgeting, capital structure, bankruptcy, long-term debt and leasing decisions. *Prerequisite:* FIN 300. 3 hours or ¾ unit.

322. Case Studies in Corporate Finance
Course, totally devoted to the study of financial management cases, provides students a hands-on learning experience. The case work helps students to develop their analytical and interpretative skills in solving unstructured real world problems. The theoretical concepts and tools learned in the introductory finance courses provide the foundation for the case studies. Topics discussed include financial forecasting and working capital management; capital budgeting and cost of capital; and capital structure, dividend policy, corporate financing, financial restructuring, financial distress, mergers, acquisitions and firm valuation. *Prerequisite:* FIN 300. 3 hours or ¾ unit.

324. Financing Emerging Businesses

Study of the business environment, alternative methods of organization and financing, use of financial statements as a management tool, valuation methods and approaches to ethical dilemmas from the perspective of an owner-manager. *Prerequisite:* FIN 300 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

341. Property-Liability Insurance

Examines in detail the functions of property-liability insurers, including marketing, underwriting, claims, ratemaking and administration, and the major current issues facing this industry. *Prerequisite:* FIN 260. 3 hours, or $\frac{3}{4}$ or 1 unit.

343. Financial Risk Management of Insurance Enterprises

Introduces basic concepts in financial economics used in the analysis and management of financial risks, with an emphasis on the applications by insurers and pension plans; topics include decision making under uncertainty, economic statistics, deterministic and stochastic interest rate models, derivative securities, valuation, binomial models and option pricing models. *Prerequisite:* FIN 300; either FIN 260 or 262; MATH 245 or equivalent; MATH 309; MATH 315 or 383; electronic spreadsheet proficiency. 3 hours, or $\frac{3}{4}$ or 1 unit.

345. Corporate Risk Management

Case study course examining how corporations deal with pure risk. *Prerequisite:* FIN 254, 341, and 360. 3 hours, or $\frac{3}{4}$ or 1 unit.

360. Employee Benefit Plans

Same as L I R 360. Studies the structure and financial issues involved in employee benefit plans, specifically group life, disability medical care plans, qualified pensions and profit-sharing plans. *Prerequisite:* FIN 260, ECON 240, B ADM 351, or graduate standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

361. Investments

Current theories of portfolio management are covered in considerable detail to provide a conceptual framework for the evaluation of investment strategies. Applications and implementation are covered in depth, including performance evaluation and international diversification. *Prerequisite:* FIN 300. 3 hours or $\frac{3}{4}$ unit.

362. Options and Futures Markets

Introduction of options and futures markets for financial assets; examination of institutional aspects of the markets; theories of pricing; discussion of simple as well as complicated trading strategies (arbitrage, hedging and spread); application of the securities for asset and risk management. *Prerequisite:* FIN 300, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

364. International Financial Markets

Course covers the three major international financial markets; the foreign exchange market, the eurocurrency market, and the international equity and bond market. The course looks at international financial decisions including operations, structure and valuation. *Prerequisite:* FIN 300. 3 hours or $\frac{3}{4}$ unit.

372. Financial Engineering

Course will present and analyze modern tools for identification, measurement, and management of financial risk faced by corporations and institutional investors; in particular as related to the application of futures, forwards, options, swaps, and other derivative securities. The focus will be evenly split between theoretical models and practical applications, and will include careful consideration of parameter estimation and numerical implementation. *Prerequisite:* FIN 300 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

382. Urban Real Estate Valuation

The terminology, theory and techniques of real estate valuation (appraisal); a modern view of the three approaches to estimating value—sales comparison, cost and income. Special requirements include local field trips to appraise at least one single-family property and one income property. *Prerequisite:* FIN 254, or FIN 264, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

384. Real Estate Investment

Approach to the evaluation of real estate investment opportunities. Begins with the identification of the investor's goals and ends with an investment decision. Considers legal, physical, locational, and financial constraint, aggregate real estate and financial markets, tax considerations and investment criteria. *Prerequisite:* FIN 254 and electronic spreadsheet proficiency, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

386. Urban Economics

Same as ECON 361. See ECON 361.

388. Real Estate Financial Markets

Discusses real estate financing techniques and the secondary market for real estate financial assets including mortgage backed securities and mortgage backed finance. *Prerequisite:* FIN 300, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

390. Legal Environment of Real Estate

Overview of legal concepts, issues, and principles involving real estate. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

400. Theory of Financial Decision Making

Examines theoretical frameworks for financial decision making under certainty and uncertainty, as well as perfect and imperfect capital markets; discusses state preference, mean-variance, and continuous time models; emphasizes the structure of individual utility functions. *Prerequisite:* ECON 402; STAT 310; and admission to doctoral program or consent of instructor. 1 unit.

420. Macrofinance: Policies, Institutions, and Markets

Overview of the workings of the financial sector of the macro economy; includes the roles of financial institutions, financial markets, macroeconomic policies, interest rates, and the flows of funds. *Prerequisite:* FIN 451, or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

425. Management of Financial Institutions

Studies financial intermediation emphasizing analysis of problems faced by commercial bank managers. Three main areas covered are the role of financial intermediation and its relation to the macro-economy, information technology, and government regulation; examination of the problems of pricing and evaluating the risk of bank financial services such as loans, loan commitments, and swaps; and consideration of bank portfolio risk management. *Prerequisite:* FIN 451, or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

427. Seminar in Macrofinance and Financial Institutions

Reports and explores research in areas of commercial bank models and behavior, bank structure and regulation, interest rate theories, financial markets, and the impact of macroeconomic policies and procedures on financial markets and institutions; discusses current research and research procedures. *Prerequisite:* FIN 400 and ECON 403. 1 unit.

444. International Financial Management

Studies international financial markets to include Euro markets and foreign exchange markets; studies the financing and investment decisions of multinational organizations to include working capital, capital budgeting, cost of capital, and capital structure decisions in an international environment. *Prerequisite:* FIN 451, or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

451. Financial Management

Introduction to financial management and decision making. Topics include risk-return relationships for financial securities; financial statement analysis and forecasting; working capital management; capital budgeting and the resource allocation process; capital structure and the cost of capital; dividend policy. *Prerequisite:* Enrollment in the Executive MBA Program Administration, MSBA, or MS program. 1 unit.

452. Advanced Corporate Finance

Addresses both the theoretical and applied aspects of firms' financing decisions; topics include capital structure and cost of capital theories; mergers, acquisitions and leveraged buy-outs; options, warrants and convertibles; venture capital and initial public offerings; and pensions. *Prerequisite:* FIN 451, plus either ECON 470 or B ADM 472 or concurrent registration in either course; or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

453. Cases in Corporate Finance

Course focuses on financial management cases. Provides students with an active learning experience. Case work is based on concepts learned in introductory corporate finance. Topics discussed include financial forecasting and short-run financial management; capital investment and cost of capital; and capital structure, dividend policy; and firm valuation. *Prerequisite:* FIN 451, plus either ECON 470 or B ADM 472 or concurrent registration in either course; or MBA 405 (Sec-

tion G—Financial Markets and Institutions), or consent of instructor. 1 unit.

454. Seminar in Corporate Financial Theory

Theories, paradigms, and models of nonfinancial corporations; investigates the theoretical foundations and empirical evidence regarding corporate resource allocation, capital structure decisions, and dividend policies; covers in detail contingent claim analysis, signaling theory, and agency theory. *Prerequisite:* FIN 400 and ECON 471. 1 unit.

455. Seminar in Investments

Investigates portfolio theory, CAPM, OPM, and arbitrage pricing theory theoretically and empirically; uses both mathematical statistics and modern econometric models to empirically analyze investment decisions and portfolio management. *Prerequisite:* FIN 400 and ECON 471. 1 unit.

456. Investments

Introduction to investment analysis, including the theory and implementation of portfolio theory; empirical evidence on the performance of financial assets; evaluation of portfolio investment strategies; and the extension of diversification to international markets. *Prerequisite:* FIN 451, or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

457. Financial Derivatives

Introduction to options, futures, swaps and other derivative securities; examination of institutional aspects of the markets; theories of pricing; discussion of simple as well as complicated trading strategies (arbitrage, hedging, and spread); applications for asset and risk management. *Prerequisite:* FIN 451, or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

458. Management of Fixed Income Portfolios

Conceptual foundations and implementation of strategies for the selection, evaluation, and revision of portfolios of fixed-income financial assets (bonds); examination of related research. *Prerequisite:* FIN 451; or BUS 405 (Section G—Financial Markets and Institutions); or consent of instructor. 1 unit.

464. Real Estate and Urban Land Economics

Discusses the theory and practice of real estate and urban land economics; emphasizes real estate market analysis, finance, appraisal, and investment. *Prerequisite:* FIN 451, plus ECON 300 and 400, or equivalent; or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

469. Problems in Urban Land Economics

Examines theoretical and empirical research into selected problems in urban land economics. *Prerequisite:* FIN 264 and ECON 300; or FIN 464; or consent of instructor. 1 unit.

471. Seminar in Insurance

Reviews recent contributions to the insurance literature concentrating upon current issues and research methodology; requires students

to review selected recent articles on a variety of topics; gives attention to application of finance and economic theory to insurance issues and to empirical techniques for testing hypotheses. Examples of issues include the application of asset pricing models to insurance pricing, portfolio optimization for insurance companies, capital markets and insurance cycles, moral hazard and adverse selection. *Prerequisite:* FIN 400. 1 unit.

472. Financial Engineering

Course will present and analyze modern tools for identification, measurement, and management of financial risk faced by corporations and institutional investors; especially as related to the application of forwards, futures, swaps, and other derivative instruments. Focus will be on using various financial instruments to control an entity's exposure to financial risks. Class time will be approximately evenly split between theoretical models and practical applications. *Prerequisite:* FIN 451, or MBA 405 (Section G—Financial Markets and Institutions), or consent of instructor. 1 unit.

490. Individual Study and Research

Directed reading and research. ½ to 1 unit.

499. Thesis Research

Required for those writing master's and doctoral theses in finance. 0 to 4 units.



FINE AND APPLIED ARTS

Dean and Program Administrator: Kathleen F. Conlin

Dean's Office: 115 Architecture Building, 608 East Traft Drive, Urbana

Phone: 333-6061

URL: www.faa.uiuc.edu

Fine and Applied Arts (FAA)

190. Exploration of the Arts

Introduction to the fine arts through literature-discussions with a teacher-practitioner in each of the arts and through written critiques of exhibits, concerts, and plays; provides creative experiences by a final, individual, or small group project. 3 hours. May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

206. Practicum in Teaching the Arts to Preschool Children

Laboratory for teaching art and music to preschool children augmented with a seminar, including classroom preparation and evaluation. *Prerequisite:* ARTED 203 and MUSIC 240. 4 hours. Arrange 2 hours set-up Friday afternoon.

299. FAA Study Abroad

Provides campus credit for foreign study and/or travel. A detailed proposal for study abroad must be submitted for approval by the appropriate committee of the department in

which the student is studying and the college dean's office prior to such study abroad. Final determination of credit and its application toward the degree is made after a review of the student's work abroad by the above committee and college office. *Prerequisite:* Junior standing in the department; approval of the student's proposal by the departmental committee and the college office. 0 to 12 hours (summer session, 0 to 6 hours).

392. Ford Seminar: Conceptual Foundations

Same as L A S 392. Interdisciplinary undergraduate seminar that lays the theoretical and topical groundwork on an annual theme, and develops models for the ways the arts function as key resources in the investigation of cultural identity. *Prerequisite:* Consent of instructor. 3 hours. Students may not receive credit for this course and L A S 392. May be repeated in separate semesters to a maximum of 9 hours.

393. Ford Seminar: Research and Arts Practicum

Same as L A S 393. Interdisciplinary undergraduate seminar building on the intellectual foundation established in F A A 392. Course enables students to work with resident scholars and artists in preparation for summer fieldwork. *Prerequisite:* Consent of instructor. 3 hours. Students may not receive credit for this course and L A S 393. May be repeated in separate semesters to a maximum of 9 hours.

394. Ford Seminar: Fieldwork Abroad

Same as L A S 394. Innovative foreign fieldwork experience that strengthens the scholarly and creative exchanges between resident scholars and artists and Illinois students. *Prerequisite:* Consent of instructor. 3 hours. Students may not receive credit for this course and L A S 394. May be repeated to a maximum of 9 hours.

399. Off Campus Study

Provides opportunity for off-campus study. Detailed proposal for study off campus must be submitted for approval to the appropriate committee in the College prior to such study. Final determination of credit and its application toward the degree is made after a review of the student's off-campus work by the above committee and the Associate Dean. *Prerequisite:* Junior or graduate standing in Fine and Applied Arts and approval of program prior to registration. 0 to 12 hours, or 0 to 3 units.

492. Ford Seminar: Advanced Conceptual Foundations

Same as L A S 492. Interdisciplinary graduate seminar that lays the theoretical and topical groundwork on an annual theme, and develops models for the ways the Arts function as key resources in the investigation of cultural identity. *Prerequisite:* Consent of instructor. ¾ or 1 unit. Students may not receive credit for this course and L A S 492. May be repeated in separate semesters to a maximum of 3 units.

493. Ford Seminar: Advanced Research and Arts Practicum

Same as L A S 493. Interdisciplinary graduate seminar building on the intellectual foundation established in F A A 492. Course enables

students to work with resident scholars and artists in preparation for summer fieldwork. *Prerequisite:* Consent of instructor. $\frac{3}{4}$ or 1 unit. Students may not receive credit for this course and L A S 493. May be repeated in separate semesters to a maximum of 3 units.

494. Ford Seminar: Advanced Fieldwork Abroad

Same as L A S 494. Innovative foreign fieldwork experience that strengthens the scholarly and creative exchanges between resident scholars and artists and Illinois students. *Prerequisite:* Consent of instructor. $\frac{3}{4}$ unit. Students may not receive credit for this course and L A S 494. May be repeated in separate semesters to a maximum of 3 units.

FOOD SCIENCE AND HUMAN NUTRITION

Department Head: Bruce M. Chassy
Department Office: 260 Bevier Hall, 905 South Goodwin Avenue, Urbana
Phone: 244-4498
URL: www.aces.uiuc.edu/~fshn

Food Science and Human Nutrition (FSHN)

101. Introduction to Food Science and Human Nutrition

Study of food in relation to chemical composition, nutritional value, safety and regulation. Introduction to preservation and processing methods, packaging, and ingredient functions. Consideration of factors that influence food patterns and choices. 3 hours.

120. Contemporary Nutrition

Fundamental principles of human nutrition and their application to the selection of adequate diets; current topics of nutritional importance. *Prerequisite:* CHEM 100 or equivalent. 3 hours.

131. Introductory Food Laboratory

Application of food preparation principles and techniques in the preparation of standard food products; principles of food management and their application in the planning and preparation of meals. A laboratory fee is assessed each student. *Prerequisite:* FSHN 101. 3 hours.

140. Introduction to the Hospitality Industry

Overview of the hospitality industry with emphasis on organizational and operational structures of the major segments of the industry and career opportunities within each. Field trips required. 3 hours.

145. Introduction to Hospitality Management

Explore the foodservice aspect of the hospitality industry by assisting Hospitality Management seniors in the Bevier Cafe/Spice Box

taking either FSHN 341 or 355. Course covers the planning, production and service of meals in specialized settings. Required field trip to Chicago. 3 hours. Approved for S/U grading.

149. Applied Food Service Sanitation

Examines the dangers, costs and prevention of foodborne illness as well as the training and motivation of food service employees in sanitary food handling and quality assurance practices. Upon completion of this course, student will be eligible to apply for the food service sanitation certificate issued by the State of Illinois. *Prerequisite:* FSHN 101 and 131; MCBO 100 and 101, or consent of instructor. 1 hour.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

202. Sensory Evaluation of Foods

The physiology, psychology, and chemistry of flavor and flavor perception; tactual, visual, and auditory components affecting food acceptability; principles and application of preference and discrimination testing; and interpretation of panel evaluation data. 3 hours.

204. Food Microbiology for Nonmajors

Introduction to food plant sanitation and the role of microorganisms in food manufacture. *Prerequisite:* Sophomore standing. 1 hour. Students may not receive credit for both FSHN 101 and 204.

213. Food Analysis, I

Principles and application of the chemical, physical, and instrumental methods used to determine the constituents of foods; special considerations applicable to the analysis of certain foods. Lecture and lab. *Prerequisite:* CHEM 231. 4 hours.

220. Principles of Nutrition

Nutritive value of foods and metabolism of essential nutrients; application of principles of nutrition to the requirements of normal individuals throughout the life cycle. *Prerequisite:* CHEM 102 or 103; PHYS 103. 3 hours.

229. Communication Techniques in Nutrition

Application and integration of the principles of nutrition and their transmission to groups and individuals. Students will learn individual counseling techniques as well as how to present nutrition information to groups. Open to Dietetics junior and seniors only. *Prerequisite:* FSHN 220 or equivalent. 3 hours.

231. Food Systems

Application of chemical principles and physical behavior of ingredients in food systems and the effects processing and storage have on finished food products. A laboratory fee is assessed. *Prerequisite:* CHEM 102 or equivalent; FSHN 131. 3 hours.

240. Management of Quantity Food Production and Service

Introduction to the management of commercial and noncommercial foodservice systems through the operation of Bevier Cafe. Students experience managing the procurement, pro-

duction and service of food, as well as the sanitation and maintenance of equipment and facilities. *Prerequisite:* FSHN 231, credit or concurrent registration in FSHN 149 and 245. 4 hours.

245. Purchasing for the Hospitality Industry

Introduction to the principles and procedures for the purchasing, selection and procurement of food and nonfood items in the hospitality industry. *Prerequisite:* FSHN 131, or consent of instructor. 3 hours. Field trips required.

248. Hotel/Motel Management and Operations

Introduction to the knowledge, attitudes and skills necessary to be an effective manager in delivering quality customer service within the hotel industry. Field trips required. *Prerequisite:* FSHN 140, or consent of instructor. 2 hours. Offered in alternate years.

250. Professional Work Experience

Supervised learning experience through a cooperative program with an FSHN related agency, business, or industry. *Prerequisite:* Junior standing and consent of department head; not open to students on probation. 2 to 4 hours.

260. Raw Materials for Processing

Problems involved with procurement, harvesting, handling, and storage of fruits, vegetables, cereal grains, dairy products, red meat, poultry, fish, and eggs for the food-processing industry. *Prerequisite:* One high school course in biological science and FSHN 101. 4 hours. Field trips to specialized operations.

291. Thesis

Intended primarily for candidates for honors but open to other seniors. *Prerequisite:* Senior standing; approval of head of department. 3 to 5 hours.

292. Thesis

Intended primarily for candidates for honors but open to other seniors. *Prerequisite:* Senior standing; approval of head of department. 3 to 5 hours.

297. Seminar in Dietetics

Discussion of current topics in Dietetics, ethical issues, and career options. *Prerequisite:* Senior standing or consent of instructor. 1 hour. Required for students planning on becoming Registered Dietitians.

298. Undergraduate Seminar

Discussion of specialized topics and literature relating to Food Science. 1 hour. Required for graduation in the food science or food industry and business curricula.

305. Pediatrics and Nutrition

Same as C & I 324 and HDFS 305. Basic principles of nutrition, health and disease relevant to infants and children in group settings. Presents bio-medical concepts necessary for an understanding of subject matter. *Prerequisite:* Three hours of social sciences and 6 hours of natural sciences courses. 3 hours, or $\frac{3}{4}$ or 1 unit. Not recommended for students majoring in nutrition or related field of study.

314. Food Chemistry

Examines the chemical aspects of major food components; water, carbohydrates, proteins, and lipids; properties of pigments, salts, and food dispersions. *Prerequisite:* CHEM 231 and 234. 3 hours or $\frac{3}{4}$ units. Food Science majors must enroll concurrently in FSHN 316.

315. Food Biochemistry and Biotechnology

Examines biochemical pathways associated with the major food components of carbohydrates, lipids, and proteins. Enzyme kinetics, regulation, and catalytic mechanisms; undesirable compounds in foods; postharvest biochemistry/physiology. Basics of biotechnology, biotechnology techniques, and their application to foods. *Prerequisite:* FSHN 314; and CHEM 231 and 234. 3 hours or $\frac{3}{4}$ units.

316. Food Chemistry Laboratory

Chemical and physical properties of water, proteins, lipids, carbohydrates, and other food components/additives are discovered in the context of their interactions and functional roles in foods. *Prerequisite:* CHEM 231 and 234 and concurrent enrollment in FSHN 314. 2 hours or $\frac{1}{2}$ unit. Food Science students must register for both courses to complete registration.

317. Introductory Physical Chemistry of Foods

One-semester course in physical-chemical applications to foods that are important in food science and technology, as well as in the food industry. Lectures and problems focusing on simple applications of principles and important problems in food science and technology, such as extrusion of food doughs, starch gelatinization and food protein aggregation. *Prerequisite:* CHEM 102, PHYCS 101, FSHN 213 and 231 or equivalents; or consent of instructor (a calculus course is recommended but not required). 2 or 3 hours, or $\frac{1}{2}$ or $\frac{3}{4}$ units. Two hours credit for the lecture and an additional one hour for the optional laboratory.

320. Nutritional Aspects of Disease

Same as NUTRS 320. Examines nutritional, biochemical, and physiological aspects of disease processes and studies the role of nutrition in prevention, management, and treatment of disease. *Prerequisite:* FSHN 220 or comparable course with a physiology prerequisite; BIOCH 350 or equivalent. 3 hours or $\frac{3}{4}$ unit.

322. Nutrition Through the Life Cycle

Examines physiological changes that occur during gestation, postnatal growth, and aging and the influence of these changes on nutritional requirements. *Prerequisite:* FSHN 220; senior standing or consent of instructor. 3 hours or $\frac{3}{4}$ unit. Offered in alternate years.

323. Recent Advances in Foods and Nutrition

New developments in foods and nutrition; readings, lectures, and discussions. *Prerequisite:* FSHN 220 and 231, or equivalent. 2 hours or $\frac{1}{2}$ unit.

325. Economics of Food Marketing

Same as ACE 325. See ACE 325.

326. Human Nutritional Biochemistry, I

Same as NUTRS 326. Advanced human nutrition, with emphasis on the biochemical functions of nutrients essential for humans. Course emphasizes the role of essential nutrients in fuel metabolism, cell biology and biochemistry, gene expression and the synthesis of proteins, and generation of energy from metabolic fuels. *Prerequisite:* Junior standing or higher, FSHN 220 or 314. 3 hours or $\frac{3}{4}$ unit.

327. Human Nutritional Biochemistry, II

Same as NUTRS 327. Advanced human nutrition, with emphasis on the biochemical functions of nutrients essential for humans. Course emphasizes the role of nutrients in carbohydrate, lipid, and protein digestion and metabolism; and nutritional aspects of endocrinology. *Prerequisite:* Junior standing or higher, FSHN 220 or 314. 3 hours or $\frac{3}{4}$ unit.

328. Community Nutrition

Same as NUTRS 328. Application and integration of the principles of nutrition and their delivery in the context of social, political, and economic environments in local, national, and international settings. *Prerequisite:* FSHN 220 or equivalent, one introductory statistics course, and one course in the social or behavioral sciences. 3 hours or $\frac{3}{4}$ unit. Offered in alternate years.

329. Therapeutic Nutrition and Assessment

Application of the principles of normal and therapeutic nutrition, nutrition assessment, nutrition intervention and evaluation as related to the management and treatment of disease states. Laboratories will allow for the development of skills in each of these areas. *Prerequisite:* FSHN 320 or concurrent enrollment. 3 hours or $\frac{3}{4}$ unit.

330. The Experimental Study of Foods

Principles and techniques of foods research are examined, including the effects of formula and preparation variations on chemical, physical, and sensory qualities of foods. Design of experiments, analysis of data and scientific writing principles are emphasized. A laboratory fee is assessed. *Prerequisite:* Completion of campus Composition I general education requirement, FSHN 231 or equivalent, and an introductory statistics course, such as STAT 100, SOC 185, ACE 261, FSHN 340, or EDPYSY 390. 5 hours or $1\frac{1}{4}$ units.

340. Applied Statistical Methods

Same as AG E, ANSCI, CPSC, and NRES 340. See CPSC 340.

341. Managing Catering Operations

Basic principles of marketing, financial management, food preparation and service, and personnel management will be applied through the catering business of Bevier Cafe/Spice Box. Students will be responsible for one catered event during the semester and help in the execution of all others. *Prerequisite:* FSHN 240. 3 hours or $\frac{3}{4}$ unit.

350. Hospitality Management: Skills and Applications

Application of behavioral science and management techniques, methods and strategies to the hospitality industry. Applied manage-

ment techniques will focus on those managerial behaviors needed to develop and maintain positive and productive relationships with subordinates, peers, supervisors and individuals external to the hospitality organization. *Prerequisite:* FSHN 240 and 341, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

355. Management of Fine Dining

Advanced application of food production and management principles to specific food service demands; emphasis on artistry in preparation, serving, and merchandising high quality food in quantity. *Prerequisite:* FSHN 240 and 341, and credit or concurrent registration in FSHN 350. 4 hours or 1 unit.

360. Engineering for Food Processing

Examines application of process engineering principles to the conversion of raw agricultural materials into finished food products. Topics include units and dimensions, materials balances, energy balances, thermodynamics, heat transfer, psychrometry, refrigeration and mechanical separations. *Prerequisite:* PHYCS 101 and MATH 120; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

361. Food Processing, I

Principles, unit operations, and applications of food preservation and processing by high temperature, refrigeration, and freezing processes; includes heat transfer, kinetics, chemical and microbial changes in food as a result of processing; lecture, laboratory, and field trip. *Prerequisite:* FSHN 213, 260, and 360; and FSHN 231 or 314 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

362. Food Processing, II

Principles and applications of food preservation and processing including evaporation, dehydration, freeze-concentration, membrane processing, extrusion and water activity control; lectures, laboratories, and field trips. *Prerequisite:* FSHN 361 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

365. Principles of Food Technology

Overview of processing techniques in the food industry, including thermo-processing, freezing, moisture removal, moisture control and intermediate moisture food formulation. Lecture and field trips. *Prerequisite:* FSHN 231 or food chemistry equivalent with consent of instructor. 3 hours or $\frac{3}{4}$ unit. FSHN 365 is not offered to undergraduate food science majors or graduate students specializing in food processing/engineering. Students may not receive credit for both FSHN 365 and the FSHN 361-362 sequence.

366. Food Product Development

Principles of food product development: idea generation, formulation, processing, market positioning, packaging, product costs, pricing, safety, legal issues, and experimentation. Includes a group term project in accordance with Institute of Food Technologists national competition guidelines. *Prerequisite:* MCBIO 100 and 101, or CHEM 102 and 107, or BADM 202. 3 hours or $\frac{3}{4}$ units. May be repeated in separate semesters to a maximum of 6 hours or $1\frac{1}{2}$ units.

371. Food and Industrial Microbiology

Same as MCBIO 311. Relationship of microorganisms to food manufacture and preservation, to industrial fermentation and processing, and to sanitation. *Prerequisite:* MCBIO 101 or 201 or equivalent; credit or concurrent registration in organic chemistry laboratory, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

372. Sanitation in Food Processing

Studies the principles of sanitation with emphasis on practical considerations as they apply to various food-processing industries; control of insects, rodents, and micro organisms; fundamentals of detergency; sanitation of water supplies; waste disposal methods; and government and public health regulations. Field trips to local food-processing plants. *Prerequisite:* CHEM 102 and MCBIO 101. 2 hours or $\frac{1}{2}$ unit.

380. Basic Toxicology

Same as CPSC, ENVST, and V B 349. Emphasizes the physiology and biochemistry of intoxication; discusses the types of cellular response to toxic compounds and the role of species variation in the economic use of toxins as pesticides and therapeutic agents. *Prerequisite:* BIOCH 350 or 352, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

399. Special Problems

Supervised research on special problems in food science and human nutrition. *Prerequisite:* Written consent of instructor must be obtained prior to enrollment. Not open to undergraduates who are on probation. The honors section is open to James Scholars and other students having a minimum grade-point average of 3.0 and may be taken in conjunction with other courses in this department with consent of the instructor. 1 to 5 hours, or $\frac{1}{4}$ to $1\frac{1}{4}$ units. May be repeated to a maximum of 2 units.

410. Current Topics in Nutritional Research
Same as ANSCI and NUTRS 410. See NUTRS 410.

411. Comparative Regulation of Macronutrient Metabolism

Same as NUTRS and ANSCI 411. See NUTRS 411.

412. Physical Chemistry of Food Processes

Studies physicochemical processes in foods during food processing; places special emphasis on methodological and experimental aspects of food processes, such as water activity, rheology of foods, food extrusion, protein hydration, gelatin, aggregation, and food process analyses. *Prerequisite:* FSHN 314 or BIOCH 350. 1 unit. Offered in alternate years.

418. Chemistry of Lipids in Foods

Detailed examination of the chemical and physical properties of lipids in foods. *Prerequisite:* FSHN 314 or consent of instructor. $\frac{3}{4}$ unit. Offered in alternate years.

420. Advanced Clinical Nutrition

Same as NUTRS, and MEDS 461. See NUTRS 461.

460. Membrane Separations Technology

Examines theory and applications of synthetic semipermeable membranes in reverse osmosis, ultrafiltration, microfiltration, and electrodialysis processes; thermodynamics of bioseparations, membrane chemistry and properties, process engineering, equipment design, fouling of membranes, selected applications. *Prerequisite:* FSHN 360 or consent of instructor. $\frac{1}{2}$ unit. Offered in alternate years.

473. Advanced Food Microbiology

Detailed examination of food and industrial processes dependent on fermentation and other microbial activities. *Prerequisite:* Organic chemistry, calculus, and MCBIO 311. $\frac{3}{4}$ unit. Offered in alternate years.

490. Dietetic Internship Experience, I

Supervised learning experience in a variety of settings and locations related to clinical nutrition, community nutrition, and food service management within Urbana/Champaign and surrounding areas. *Prerequisite:* Enrollment in dietetic internship program. 1 unit. Offered in summer only.

491. Dietetic Internship Experience, II

Supervised learning experience in a variety of settings and locations related to clinical nutrition, community nutrition and health promotion, and food service management within Urbana/Champaign and surrounding areas. *Prerequisite:* FSHN 490. $1\frac{1}{2}$ units.

493. Seminar in Foods

Discusses and evaluates current literature related to specialized topics in foods. *Prerequisite:* Undergraduate degree in foods, nutrition, or comparable background in chemistry, microbiology, physiology, or other biological science; consent of instructor. $\frac{1}{2}$ unit.

495. Advanced Topics in Food Science

Studies of selected topics in Food Science. Study may be on specialized topics in any one of the following fields: food chemistry, food microbiology, nutrition, food processing/engineering. Lectures and/or laboratory. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit. Students may register only once for a given topic.

496. Seminar in Nutrition

Discusses and evaluates current literature related to topics in nutrition. *Prerequisite:* Undergraduate degree in foods, nutrition, or comparable undergraduate degree in biochemistry, microbiology, physiology, or other biological science; consent of instructor. $\frac{1}{2}$ unit.

497. Seminar

Discussions on specialized topics and current literature relating to food technology. Required of all graduate students in food science. 0 or $\frac{1}{4}$ unit.

498. Advanced Special Problems

Supervised individual study on advanced special problems in food science and human nutrition. *Prerequisite:* Written consent of instructor must be obtained prior to enrollment. $\frac{1}{4}$ to 2 units (summer session, $\frac{1}{4}$ to 1 unit).

499. Thesis Research

Original research designed and conducted under graduate faculty supervisor. 0 to 4 units.

FRENCH

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Note: Students in elementary and intermediate language courses may not ordinarily register for credit in more than one course at the same semester level (e.g., 104 or 114 or 124). Approval to do so must be obtained from the department.

French (FR)

101. Elementary French, I

Four-skill course leading toward elementary proficiency in oral expression, listening comprehension, reading, writing, and cultural understanding. Open only to students with no previous study of French. Language laboratory assignments required. 4 hours. Credit is not given for both FR 101 and 105.

102. Elementary French, II

Continuation of FR 101. Introduces cultural and supplementary enrichment materials; requires laboratory sessions as in FR 101. *Prerequisite:* FR 101 or one year of high school French. 4 hours. Credit is not given for both FR 102 and 105 or 106.

103. Intermediate French, I

Continuation of FR 102. Introduces students to a full range of structures to complete their initial study of the grammatical system; emphasizes the development of all four skills and cultural understanding through readings and audiovisual enrichment materials. Students planning to major or minor in French should take FR 133 in lieu of FR 103. *Prerequisite:* FR 102 or equivalent, or a placement score showing high school achievement equivalent to FR 102. 4 hours. Credit is not given for both FR 103 and 106.

104. Intermediate French, II

Continuation of FR 103. Comprehensive grammar review with emphasis on oral expression and the continued development of reading and written skills. Completion satisfies graduation requirement in the College of Liberal Arts and Sciences. Students planning to take advanced French courses should take FR 134 in lieu of FR 104. *Prerequisite:* FR 103 or equivalent, or a placement score showing high school achievement equivalent to FR 103. 4 hours.

105. French Active Review, I

Reviews materials covered in FR 101 and 102 in preparation for entrance into FR 103 or 133.

Open to students with high school French; by placement score or consent of department only. Not open to students with credit in FR 101 or 102. *Prerequisite:* One or two years of high school FR and placement score in 101 range. *4 hours.*

106. French Active Review, II

Reviews materials covered in FR 102 and 103 in preparation for entrance into FR 104, 114, or 134. Not open to students with credit in FR 101, 102, 103 or 105. Open to students with high school French; by placement score or consent of department only. *Prerequisite:* Three or four years of high school FR with placement at 102 level. *4 hours.*

113. Conversational Practice

Oral practice for the development of elementary conversational skill and the improvement of pronunciation; designed as a supplement to third and fourth semester French courses. *Prerequisite:* Concurrent registration in third or fourth semester French course, or consent of instructor. *1 hour.*

133. Accelerated Intermediate French, I

Similar to FR 103, but accelerated for those interested in pursuing French in advanced courses; includes comprehensive grammar review and readings in literature and culture. *Prerequisite:* FR 102, 105 or two semesters of college French, or a placement score showing high school achievement equivalent to FR 102. Normally for students with a "B" average in French or with consent of instructor. *4 hours.*

134. Accelerated Intermediate French, II

Continuation of FR 133. Comprehensive grammar review and readings in French literature and culture preparatory for continued work at the advanced level; emphasizes all four skills and culture. *Prerequisite:* FR 133 or 106, or FR 103 with department approval, or three semesters of college French, or a placement score showing high school achievement equivalent to FR 103. *4 hours.*

155. French Masterpieces in Translation

Major works of French literature, in English translation, from the Renaissance to the twentieth century. Texts and lectures in English. *3 hours.* Credit is not applicable to the major in French.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. *1 to 3 hours.* May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

205. Oral French, I

Developing oral facility and aural comprehension, focusing on everyday events. *Prerequisite:* FR 104, or 134 or equivalent. *2 hours.*

206. Oral French, II

Continuation of FR 205; optional practice in the language laboratory. *Prerequisite:* FR 205. *3 hours.*

207. Grammar and Composition

Training in French syntax, translation from English into written French, and directed composition. *Prerequisite:* Four years of high school French or equivalent, or FR 134 or, with departmental approval, FR 104. *3 hours.*

208. Critical Writing and Reading in French Literature and Culture

Intensive practice of writing and reading skills in French, emphasizing vocabulary and critical concepts important to analyzing literary and cultural texts. *Prerequisite:* FR 207 or equivalent must be taken prior to or concurrently with this course. *3 hours.*

209. Introduction to French Literature, I

Survey of French literature from the Middle Ages to the French Revolution. *Prerequisite:* FR 207 or equivalent. FR 208 must be taken prior to or concurrently with this course. *3 hours.*

210. Introduction to French Literature, II

Survey of French literature since the French Revolution. *Prerequisite:* FR 207 or equivalent. FR 208 must be taken prior to or concurrently with this course. *3 hours.*

213. French Phonetics

Practical introduction to French phonetics, stressing pronunciation. *Prerequisite:* FR 104 or 134 or equivalent. *2 hours.*

217. Advanced Oral French

Intensive practice in oral French to improve fluency, vocabulary, comprehension, pronunciation and syntax. Activities include reports, discussion, and role-play in professional situations. Also includes written assignments based on class activities. *Prerequisite:* FR 205 and 213 or equivalent. *2 hours.* May be repeated in separate semesters (but not for credit in the major or minor) to a maximum of 4 hours. (Counts for advanced hours in L.A.S.)

219. Introduction to Francophone Literature

Interpretation and analysis of major works written in French from Quebec, the Caribbean, Sub-Saharan Africa and the Maghreb and Mashrek. *Prerequisite:* FR 207. *3 hours.* May be repeated in separate semesters as topics vary to a maximum of 6 hours.

220. Sixteenth-Century Literature

General survey of the literature of the French Renaissance. *Prerequisite:* FR 209 and 210. *3 hours.* (Counts for advanced hours in L.A.S.)

223. French Literature of the Seventeenth Century, I

Major French writers of the preclassical period. *Prerequisite:* FR 209 and 210. *3 hours.* (Counts for advanced hours in L.A.S.)

224. French Literature of the Seventeenth Century, II

Major French writers of the classical period. *Prerequisite:* FR 209 and 210. *3 hours.* (Counts for advanced hours in L.A.S.)

227. French Literature of the Eighteenth Century, I

Montesquieu, Voltaire, and their contemporaries. *Prerequisite:* FR 209 and 210. *3 hours.* (Counts for advanced hours in L.A.S.)

230. French Literature of the Nineteenth Century, I: 1800-1850

Major pre-realist and romantic writers. *Prerequisite:* FR 210 or equivalent, or consent of instructor. *3 hours.* (Counts for advanced hours in L.A.S.)

231. French Literature of the Nineteenth Century, II: 1850-1900

Evolution of romanticism and realism into the naturalist and symbolist movements. *Prerequisite:* FR 210 or equivalent, or consent of instructor. *3 hours.* (Counts for advanced hours in L.A.S.)

233. French Literature of the Contemporary Period, I

Modern poetry from Baudelaire to Valéry; prose writers from 1900 to 1940. *Prerequisite:* FR 209 and 210. *3 hours.* (Counts for advanced hours in L.A.S.)

234. French Literature of the Contemporary Period, II

Continuation of FR 233. *Prerequisite:* FR 209 and 210. *3 hours.* (Counts for advanced hours in L.A.S.)

271. Introduction to Second Language Learning and Teaching

Same as GER, HUMAN, LAT, RUSS, and SPAN 271. See SPAN 271.

275. Developing and Implementing Communicative Language Teaching

Same as GER, LAT, RUSS, and SPAN 275. See SPAN 275.

278. Current Issues in Secondary Language Teaching

Same as GER, LAT, RUSS, and SPAN 278. See SPAN 278.

290. Individual Study: Major Tutorial

Tutorial taken by students during two of their last four semesters of undergraduate study. Students read the works on a departmental reading list with the guidance of a tutor, repeating enrollment for a total of 2 hours credit, normally at the rate of 1 hour per semester. *Prerequisite:* FR 205, 207, 209, and 210, or equivalent; a declared major in French; junior standing. *1 to 2 hours.* (Counts for advanced hours in L.A.S.)

292. Senior Thesis

For candidates for honors in French and for other seniors. *Prerequisite:* Senior standing. *2 hours.* May be repeated for a maximum of 4 hours credit. (Counts for advanced hours in L.A.S.)

298. Senior Seminar

Studies in authors, genres, themes, and movements in French literature; conducted entirely in French. *Prerequisite:* Senior standing. *3 hours.* May be repeated. (Counts for advanced hours in L.A.S.)

299. Study Abroad

Lectures, seminars, and practical work in French language, literature, civilization, and in other academic areas appropriate to the student's course of study. *Prerequisite:* FR 209 and two of the following: FR 205, 206, or 207; 2.75 overall average; 3.0 average in French

courses. 0 to 17 hours May be repeated to a maximum of 34 hours per academic year.

310. Modern African Fiction

Same as AFRST and C LIT 310 and ENGL 370. See AFRST 310.

313. French Phonetics and Diction

Systematic study of the sounds and sound patterns of French; training in the improvement of French pronunciation with special attention to the problems of teachers. *Prerequisite:* FR 206, or equivalent. 3 hours or ¾ unit.

314. Advanced Grammar and Style

Advanced theoretical and practical study of present-day French, with free composition and some consideration of stylistics. *Prerequisite:* FR 207 (with a grade of C or better), or equivalent. 3 hours or ¾ unit.

316. Structure of the French Language

Same as LING 316. General survey of the linguistic structure of modern standard French, including phonology, morphology, and syntax; emphasis on the differences between its spoken and written forms. *Prerequisite:* FR 313 or equivalent training in phonetics. 3 hours or ¾ unit.

319. Techniques in Translation, I

Practical course in the techniques of translating technical, commercial, scientific, and literary texts from English into French and vice versa. *Prerequisite:* FR 314 or consent of instructor. 3 hours or ½ unit.

321. Techniques in Translation, II

Continuation of FR 319. Practical exercises in translating from French to English and vice versa in a variety of texts, along with an introduction to theoretical aspects of translation. *Prerequisite:* FR 319 or consent of instructor. 3 hours or ½ unit.

335. French Civilization, I

Survey of French life and French institutions, intended as a background for literary studies and as a preparation for the teaching of French; given in French. *Prerequisite:* FR 205, 209, and 210, or equivalent. 3 hours or ¾ unit.

336. French Civilization, II

Continuation of FR 335. May be taken independently of FR 335. *Prerequisite:* FR 205, 207, 209, and 210, or equivalent. 3 hours or ¾ unit.

343. Studies in French

See *Timetable* for current topics. *Prerequisite:* Junior standing. 3 hours, or ¾ to 1 unit. May be repeated in the same or separate semesters to a maximum of 12 hours or 4 units.

360. Principles of Language Testing

Same as E I L, GER, ITAL, PORT, and SPAN 360. See E I L 360.

362. Introduction to Romance Linguistics

Same as ITAL, LING, PORT, RMLNG, and SPAN 362. See SPAN 362.

379. Studies in Francophonie

Same as C LIT 334. Studies of various genres, periods, and topics of French literature outside of France, with a different geographical

emphasis each semester. Regions include black Africa, the Caribbean, Canada, North Africa, the Middle East, and Switzerland. 3 hours, or ¾ or 1 unit. May be repeated to a maximum of 12 hours or 4 units.

380. Classroom Language Acquisition

Same as E I L, GER, ITAL, PORT, and SPAN 380. See SPAN 380.

381. Theoretical Foundations of Second Language Acquisition

Same as E I L, GER, ITAL, LING, PORT, and SPAN 389. See E I L 389.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E I L, GER, HUMAN, ITAL, PORT, SLAV, and SPAN 382, and LING 386. See HUMAN 382.

385. Commercial and Economic French, I

Studies French business practices: company structures, selling and buying techniques, banking, import/export and other commercial negotiations, employment, formalities, and conventions of letter-writing; involves both theory and practice. *Prerequisite:* FR 314 or equivalent, or consent of instructor. 3 hours or ½ unit.

386. Commercial and Economic French, II

Emphasizes business correspondence and simulation of business practices in the areas introduced in FR 385; also focuses on geographic and economic topics pertaining to France within the European community and Europe in general. *Prerequisite:* FR 385 or equivalent, or consent of instructor. 3 hours or ½ unit.

388. French and Comparative Cinema, I

Same as C LIT, CINE, and HUMAN 388. The art, techniques, sociology, politics of French cinema in the context of French culture, world history, and general film development from 1895 to approximately 1950. Selected trends studied through films from several countries with stress on major French filmmakers including Lumière, Melies, Gance, Clair, Vigo, Renoir, Carne, Cocteau, Prévert, Clouzot. Meets 6 hours a week. *Prerequisite:* One college-level cinema studies course or consent of instructor. 4 hours or 1 unit. Knowledge of French not required.

389. French and Comparative Cinema, II

Same as C LIT, CINE, and HUMAN 389. The art, techniques, sociology, politics of French cinema in the context of French culture, world history, and general film development from approximately 1950 to the present. Selected trends studied through films from several countries with stress on major French filmmakers including Clouzot, Bresson, Chabrol, Resnais, Godard, Truffaut, Berri, Varda, Blier, Marker, Rohmer, and Costa-Gavras. Meets six hours a week. *Prerequisite:* One college-level cinema studies course (FR 388 preferred) or consent of instructor. 4 hours or 1 unit. Knowledge of French not required.

399. Study Abroad

Lectures, seminars, and practical work in francophone literature and civilization, in a French-speaking country. *Prerequisite:* FR 209

and 210, and two of the following: FR 205, 206, and 207; or equivalent. 0 to 16 hours, or 0 to 4 units. Not open to undergraduates in the Paris program.

400. Beginning French for Graduate Students

Basic grammar, vocabulary, and reading practice; designed for graduate students desiring help in preparing for the French reading requirements for the Ph.D. 4 hours. No graduate credit.

401. Reading French for Graduate Students

Grammar, vocabulary, and general and special reading; designed for graduate students desiring help in preparing for the French reading requirements for the Ph.D. *Prerequisite:* FR 400, or FR 101 and 102, or equivalent. 4 hours. No graduate credit.

403. The Study of Culture: Fine Arts, History, and Literature, I

Study of major artistic, historical, political, and literary aspects of France up to the French Revolution with emphasis on the relationship between literature and other aspects of French culture. 1 unit.

404. The Study of Culture: Fine Arts, History, and Literature, II

Continuation of the approaches and emphases of FR 403 from the French Revolution to the present. *Prerequisite:* FR 403 or consent of instructor. 1 unit.

405. Techniques in Teaching College and Secondary French

Examination and discussion of classroom goals, procedures and techniques in teaching French at the college and secondary level, associated with demonstration class and supervision of teaching practice. Required of new teaching assistants in the Department of French. ½ unit.

429. Studies in French Linguistics

Variable topics course dealing with both synchronic and diachronic aspects of the French language. 1 unit. May be repeated as topics vary.

430. Introduction to Research and Textual Criticism

Proseminar in literary studies: research and methods; approaches to the literary text. Required of all M.A. and Ph.D. candidates. 1 unit.

431. Introduction to Old French Language

Outline of Old French grammar and training in reading Old French (twelfth and thirteenth centuries). 1 unit.

432. Studies in Medieval French Literature

Close study of one or more topics in Old French literature. See *Timetable* for current topics. *Prerequisite:* FR 431 or consent of instructor. 1 unit.

433. Studies in Sixteenth-Century French Literature

Close study of one or more topics in sixteenth-century French literature; see *Timetable* for current topics. 1 unit. May be repeated for credit as topics vary.

435. Studies in Seventeenth-Century French Literature

Close study of one or more topics in seventeenth-century French literature; see *Timetable* for current topics. 1 unit. May be repeated for credit as topics vary.

437. Studies in Eighteenth-Century French Literature

Close study of one or more topics in eighteenth-century French literature; see *Timetable* for current topics. 1 unit. May be repeated for credit as topics vary.

439. Studies in Nineteenth-Century French Literature

Close study of one or more topics in nineteenth-century French literature; see *Timetable* for current topics. 1 unit. May be repeated for credit as topics vary.

441. Studies in Twentieth-Century French Literature

1 unit.

443. French Studies

Flexible course limited only by the concentration of its material in French; may be activated by student request or faculty proposal. 1 unit. May be repeated as topics vary to a maximum of 4 units.

445. Studies in French Canadian Literature
Close study of one or more topics in French Canadian literature; see *Timetable* for current topics. 1 unit. May be repeated as topics vary.

452. Studies in French and Comparative Cinema

Same as C LIT 472. Historical, aesthetic, social, and technical studies of the French cinema; its development and relation to world cinema and to literature. 1 unit. May be repeated to a maximum of 3 units.

462. Seminar in Romance Linguistics

Same as ITAL, LING, PORT, RMLNG, and SPAN 462. See SPAN 462.

463. College Teaching of Foreign Languages

Same as E I L, GER, ITAL, PORT, RUSS, and SPAN 463. Theoretical framework for college foreign language curricula; review of research articles and discussion on learner factors and teaching and testing of listening comprehension, speaking, reading, writing, cultural understanding, and literary appreciation. ½ or 1 unit.

470. Seminar in Old French Literature

Discussion and research on some specialized topic in Old French literature. See *Timetable* for current topic. *Prerequisite:* FR 431 or consent of instructor. 1 unit. May be repeated.

471. Seminar in Sixteenth-Century French Literature

Discussion and research on some specialized topic in sixteenth-century French literature. See *Timetable* for current topic. 1 unit. May be repeated.

472. Seminar in Seventeenth-Century French Literature

Discussion and research on some specialized topic in seventeenth-century French literature. See *Timetable* for current topic. 1 unit. May be repeated.

473. Seminar in Eighteenth-Century French Literature

Discussion and research on some specialized topic in eighteenth-century French literature. See *Timetable* for current topic. 1 unit. May be repeated.

474. Seminar in Nineteenth-Century French Literature

Discussion and research on some specialized topic in nineteenth-century French literature. See *Timetable* for current topic. 1 unit. May be repeated.

478. Seminar in Twentieth-Century French Literature

Same as C LIT 478. Discussion and research on some specialized topic in twentieth-century French literature. See *Timetable* for current topic. 1 unit. May be repeated.

479. Seminar in French Literature

Discussion and research on some specialized area in French literature. See *Timetable* for current topic. 1 unit. May be repeated.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as E I L, GER, ITAL, PORT, RUSS, and SPAN 481. Language teaching problems considered in the light of theoretical and experimental work in language acquisition, verbal learning and memory, motivation, speech perception, reading, error analysis, and language as an aspect of culture and societal relations. *Prerequisite:* Consent of instructor. 1 unit.

490. Seminar in Contemporary Criticism, Methods and Theory

Same as C LIT 490. Deals with a particular individual, school, method or problematic in structuralist or post-structuralist thought; normally taught in English, and texts may be read in French or English, if available. *Prerequisite:* An introductory course in criticism, or consent of instructor. 1 unit. May be repeated as topics vary.

491. Individual Topics

Prerequisite: Graduate standing with a major or minor in French. ¼ to 2 units.

499. Thesis Research

0 to 4 units.

GENERAL ENGINEERING

Head of Department: Harry E. Cook
Department Office: 117 Transportation Building, 104 South Mathews Avenue, Urbana
Phone: 333-2731
URL: www.ge.uiuc.edu

General Engineering (G E)

100. Introduction to General Engineering

Course introduces the engineering profession, generally, and General Engineering, in particular. Hands-on exercises and projects introduce technical and nontechnical issues in General Engineering. 1 hour.

103. Engineering Graphics and Design

Use of traditional and microcomputer methods as instructional tools in engineering graphics; topics include: text creation, formal and sketch-mode drawing, scaled inquiry and layout; charts and diagrams; pictorial representations; multiview orthographic representations; principal auxiliary views; sectioned views; dimensioning; production drawings; introduction to engineering design; and fundamental descriptive geometry. 3 hours.

193. Special Problems

Individual investigations of any phase of general engineering selected by the students and approved by the department. *Prerequisite:* Consent of instructor. 0 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

221. Introduction to General Engineering Design

Fundamental concepts in the classical and computer-based analysis and design of structural and machine components and assemblies. External loads, internal forces and displacements in statically determinate and indeterminate configurations: kinematics of linkages, gears; and cams; static forces in machines. *Prerequisite:* C S 101, MATH 225, and T A M 212 and 221. 3 hours.

222. Design and Analysis of Dynamic Systems

Operational techniques used in describing, analyzing and designing linear continuous systems; modeling, equilibrium points and linearization; Laplace transforms; response via transfer functions, stability; performance specifications; controller design via transfer functions; frequency response; simple nonlinearities. *Prerequisite:* C S 101, MATH 285 and T A M 212 and concurrent registration in G E 224. 3 hours.

224. Dynamic Systems Laboratory

Simulation and testing of dynamic systems; system identification and control synthesis; digital methods of data acquisition. *Prerequisite:* Concurrent registration with G E 222. 1 hour.

225. Instrumentation and Test Laboratory

Preparation for experimental projects; introduction to mechanical and electrical instruments; mechanical testing of materials; introduction to experimental stress analysis and photoelastic methods. *Prerequisite:* G E 221, and concurrent registration in G E 232. 1 hour.

226. Laboratory for Data Analysis

Measurement error and analysis of collected data; execution of a designed experiment; goodness of fit; model validation for simulation. *Prerequisite:* G E 288, and concurrent registration in G E 289. 1 hour.

232. Engineering Design Analysis

Studies stress/strain conditions, both analytical and numerical (CAD) solution techniques, analysis of various engineering materials and configurations, as applied to the development and application of design analysis criteria. *Prerequisite:* G E 221 and concurrent registration in G E 225. 4 hours.

241. Component Design

Design of basic engineering components: structural members, machine parts, and connections. Principles applied include: material failure (yield, fracture, fatigue); buckling and other instabilities; design reliability; and analytical simulation. *Prerequisite:* G E 222 and 232. 3 hours.

242. Project Design

Design of various engineering devices and systems. Teams of two to four students work toward the development of engineering solutions to problems supplied by industry. A midterm and final report summarize the work of the semester for sponsor and faculty. *Prerequisite:* Credit or concurrent registration in G E 241 and senior standing. 3 hours.

288. Engineering Economy and Operations Research

Introduction to an operations research approach to engineering decision making; economic analysis of alternatives; linear, integer, basic nonlinear, and dynamic programming, with specific applications to engineering problems. *Prerequisite:* MATH 225 and C S 101, or consent of instructor. 3 hours.

289. Probabilistic Decision Making

Review of introductory probability and statistics that develops more advanced concepts as needed, in the context of engineering design and decision making; designing experiments and analyzing results, with applications to robust design; Bayesian decision theory, with applications to engineering management and design; simulation modeling using a modern simulation language with applications to manufacturing process decisions. *Prerequisite:* G E 288 or equivalent and concurrent registration in G E 226. 3 hours.

291. General Engineering Seminar

Series of lectures and discussions by department faculty and visiting professional engineers on ethics, professional registration, the role of technical societies, and the relation of engineering to such disciplines as economics, sociology, and government. 0 hours.

292. Engineering Law

Nature and development of the legal system; legal rights and duties important to engineers in their professions; contracts, uniform commercial code and sales of goods, torts, agency, worker's compensation, labor law, property, environmental law, intellectual property. *Prerequisite:* RHET 105, or equivalent; senior standing or consent of instructor. 3 hours. Counts toward campus Composition II general education requirement.

293. Special Problems

Individual investigations or studies of any phase of general engineering selected by the students and approved by the department.

Prerequisite: Junior standing; consent of instructor. 0 to 4 hours. May be repeated.

323. State Space Design Methods in Control

Design methods; time domain modeling; trajectories and phase plane analysis; similarity transforms; controllability and observability; pole placement and observers; linear quadratic optimal control; Lyapunov stability and describing functions; simulation. *Prerequisite:* First course in linear control (e. g., G E 222, A A E 254, M E 240, ECE 386), and MATH 225 or equivalent. 3 hours or $\frac{3}{4}$ unit.

324. Digital Control of Dynamic Systems

Examines theory and techniques for control of dynamic processes by digital computer; linear discrete systems, digital filters, sampling signal reconstruction, digital design, state space methods, computers, state estimator, laboratory techniques. *Prerequisite:* G E 222 or equivalent. 4 hours or 1 unit.

334. Introduction to Reliability Engineering

Same as I E 334. See I E 334.

342. Project Design, I

Design of various engineering devices and systems. Teams of two to four students work toward the development of engineering solutions to problems supplied by industry. A midterm and final oral report summarize the work of the semester for sponsor and faculty. All student team members receive an identical grade. *Prerequisite:* G E 232, 323, 289; concurrent enrollment in G E 343. 2 or 3 hours, or $\frac{1}{2}$ or $\frac{3}{4}$ unit.

343. Project Design, II

Design of various engineering devices and systems. Teams of two to four students work toward the development of engineering solutions to problems supplied by industry. A midterm and final report summarize the work of the semester for sponsor and faculty. Student team members may receive different grades. *Prerequisite:* G E 232, 323, 289; concurrent enrollment in G E 342. 2 hours or $\frac{1}{2}$ unit.

354. Fundamentals of Nondestructive Evaluation

First part of this course introduces the concept of Nondestructive Evaluation (NDE), and provides a review of probability, the role of NDE in Design, and the role of NDE in manufacturing and in maintenance. The primary Nondestructive Testing and Evaluation (NDT&E) techniques, including visual methods, ultrasonic methods, acoustic emission, acousto-ultrasonics, radiological methods, electro-magnetic testing, eddy currents, penetrant methods, thermal methods, and holography, are introduced from the fundamental laws of physics. Industrial applications of these techniques towards flaw detection, material properties characterization, impact and fatigue damage evaluation, adhesion, etc., are presented. Current literature is examined. *Prerequisite:* T A M 224 or equivalent, or consent of instructor. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit.

370. Introduction to Robotics

Same as ECE 370, and C S 343. See ECE 370.

379. Robot Sensing

Same as ECE 379 and C S 344. See ECE 379.

389. Robot Dynamics and Control

Same as ECE 389. Dynamics and control of robotic manipulators. Emphasis on fundamental concepts and analytical methods for analysis and design of robot systems. Laboratory experiments complement the theoretical development. *Prerequisite:* Concurrent registration in ECE or G E 370, and an introductory course in control (i. e., G E 222, ECE 386, M E 240 or equivalent), or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

392. Patent Law and Related Topics

Patent law and related topics as they affect the engineering design process; legal requirements of patentability; patent matters in a business environment; patent office procedures; foreign patents; employer-employee relationships; patent valuation, exploitation, infringement, licensing and assignment; trade secrets, copyrights; trademarks, unfair competition; computer law. *Prerequisite:* Senior or graduate standing. 2 hours or $\frac{1}{2}$ unit.

393. Special Problems

Studies advanced problems related to general engineering. *Prerequisite:* Senior standing and consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

444. Decision Making with Multiattribute Utility Analysis

Provides the student with background and practice in applying tools for subjective multiple attribute decision making when present or future states of nature are uncertain. Includes exploration of current research in developing computer aids to decision making under risk. Discusses issues in descriptive versus normative approaches in the context of the interface between operations research and artificial intelligence. Covers multiattribute utility analysis from theoretical foundations through assessment procedures, practice, and pitfalls of potential cognitive biases. *Prerequisite:* Graduate standing; G E 288, I E 386, MATH 361, or equivalent; or consent of instructor. 1 unit.

485. Genetic Algorithms in Search, Optimization, and Machine Learning

Genetic algorithms search—procedures based on the mechanics of natural genetics and natural selection—are finding increased application to the difficult problems of engineering, science, and commerce. This course surveys what genetic algorithms are, where they come from, how they work, and how and where they have been applied. *Prerequisite:* MATH 242 and C S 101 or 131. 1 unit.

489. Robot Control Theory

Same as ECE 489. Dynamics of rigid and flexible robots; geometric methods of control; feedback linearization; robust and adaptive control; Lyapunov design methods; singular perturbation and integral manifold methods; passivity and network approaches; force control; control of multiple and redundant robots; teleoperation. *Prerequisite:* A first graduate course in control such as ECE 415, G E 491, or equivalent. 1 unit.

490. Seminar

Presentations by graduate students, staff, and guest lecturers of current topics in research and development in general engineering. 0 units. Required of all graduate students each semester.

491. Simulation of Dynamic Systems

Modeling and simulation of dynamic engineering systems; distinct modeling approaches for engineering devices; analog and digital computer simulation of dynamic systems; design criteria and performance and design measures; and extensive use of case studies and projects. *Prerequisite:* G E 222 and I E 385, or equivalent. 1 unit.

493. Special Problems

Advanced problems related to general engineering. *Prerequisite:* Consent of instructor. ¼ to 1 unit. May be repeated.

495. Evaluation and Management of Engineering Design Projects

Quantitative evaluation and optimization of project plans, using mathematical programming, multiple-criteria decision making and discrete event simulation; optimal design and sizing of engineering projects; reliability of designs, studied by acyclic network analysis and network simulation; and implementation and control of engineering designs by network analysis. *Prerequisite:* G E 288 or I E 385 or equivalent. 1 unit.

497. Project Design

Engineering design projects emphasizing advanced engineering analysis, synthesis, optimization, and engineering economics. ¼ to 2 units. May be repeated to a maximum of 2 units for credit toward the Master's degree.

499. Thesis Research

¼ to 2 units. May be repeated to a maximum of 2 units for credit toward the Master's degree.

GEOGRAPHY

Head of Department: Colin Thorn
 Department Office: 220 Davenport Hall, 607
 South Mathews Avenue, Urbana
 Phone: 333-1880
 URL: www.uiuc.edu/unit/geog

Geography (GEOG)**101. Geography of Developing Countries**

Examines the manner in which climate, landforms, resources, and cultural factors promote and inhibit change in developing countries (i.e., India, Iran, Egypt, Nigeria, China, Kenya, Brazil, Venezuela, Guatemala); makes comparisons between these countries and others in both the developing and the developed world. 3 hours.

102. Weather and Climate

Introduction to the processes responsible for the spatial variation of weather and climate with a survey of world climatic patterns. 4 hours.

103. Earth's Physical Systems

Systems approach to the physical environment, including landform, soil, vegetation, and animal elements, from a human ecological perspective. 4 hours.

104. Social and Cultural Geography

Introduces the basic concepts of social and cultural geography, and the application of these concepts to a variety of topics; mental maps, territoriality, cultural regions, cultural elements and their diffusion, population movement and migration, settlement patterns, environmental hazards, and spatial patterns of social problems. 4 hours.

110. Geography of International Conflicts

Focuses on contemporary cultural conflicts, competition among nations for economic and mineral resources; treats territorial disputes from a cultural and geographic perspective. Case studies vary to illustrate types of contemporary conflicts. 3 hours.

130. Illinois in the Changing Earth System

Same as ATMOS and GEOL 130. See ATMOS 130.

185. Introduction to Social Statistics

Same as SOC 185. See SOC 185.

198. Freshman Honors Seminar

Through discussions and research projects, the seminar is designed to provide an in-depth understanding of topics in the field of systematic or regional geography which are selected for group study. Appropriate geographic methodology is emphasized. *Prerequisite:* James Scholar standing or other designation as a superior student. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

204. Cities of the World

Introduces the form and function of cities around the world; emphasizes cross-cultural comparisons of urban landscapes and living environments as illustrated by case studies of specific cities. 3 hours.

205. Business Location Decision-Making: Theory and Practice

Same as B ADM 205. Analyzes location decision-making emphasizing industrial and commercial location patterns; identifies important institutional factors and their changing roles over the recent past; and focuses on plant closings, economic disruptions, and problems of structural change. *Prerequisite:* ECON 102 or 103, or equivalent. 3 hours.

210. Contemporary Social and Environmental Problems

Geographic perspectives on contemporary national and international problems. Topics vary each semester and include such themes as environmental quality, food production, urban problems, and particular social and political conflicts. 3 hours.

214. Conservation of Natural Resources

Survey of distribution of natural resources and major forms of utilization of these resources; emphasizes consequences of utilization systems which deplete or degrade resources and systems which conserve these resources with respect to future needs of human populations. 3 hours.

224. Geographic Patterns of Illinois

Systematic analysis of the environmental and human processes that have shaped the regional landscapes of rural and urban Illinois. 3 hours.

271. Spatial Analysis

Overview of the spatial analysis (nomothetic) approach to geographic research, both physical and human; includes discussion of the scientific method, with explanations and uses of analytic geographic concepts in studying real world problems. *Prerequisite:* A course in geography. 4 hours. (Counts for advanced hours in L A S.)

273. Spring Field Course

Field observation and mapping of human and physical phenomena using basic geographic field techniques; required ten-day field trip during spring semester break. *Prerequisite:* Geography majors, or nonmajors with consent of instructor. 4 hours.

277. Interpretation of Aerial Photographs

Same as NRES 277. Principles and techniques in extraction and analysis of information derived from aerial photographs, including black and white, color, and color infrared; applications to problems in the natural and social sciences stressed in the laboratory. A beginning FORTRAN programming course is highly desirable but not required. *Prerequisite:* Knowledge of trigonometry (MATH 114 or equivalent). 3 hours.

284. Population Geography

Problems and issues surrounding the geographic distribution of populations at the world, regional, and local levels; emphasizes problems associated with population growth and decline, recent population redistribution, births and deaths, and elderly and minority populations. 3 hours.

290. Individual Study

Supervised independent study of special topics or regions. *Prerequisite:* Junior standing; at least one formal course in the topic or region of interest; consent of instructor. 2 to 4 hours. May be repeated once. (Counts for advanced hours in L A S.)

291. Honors Individual Study

Individual study and research projects for students who are working toward the degree with distinction in geography. *Prerequisite:* Junior standing; consent of honors adviser. 2 to 4 hours. May be repeated to a maximum of 8 hours. (Counts for advanced hours in L A S.)

294. Special Topics in Social Geography

Introduction to current research in social geography; includes such topics as access to public facilities, geography of crime, innovation diffusion, geography of communications,

spatial assimilation of minorities, and geography of social well-being. See *Timetable* for current topics. 4 hours. May be repeated.

303. Advanced Physical Geography: Methodology and Applications of Landform Studies

Systematic analysis of the basic elements of physical geography and their interaction through time and surface expression, including the modifying effects of humans. Complementary to GEOL 301. *Prerequisite:* GEOG 103 or consent of instructor. 4 hours or 1 unit.

304. Soil Geomorphology

Same as GEOL 304. Analysis and review of the principles of soils as applied to geomorphology, archaeology, and geography. One weekend and several one-day field trips; student fees reflect actual field expenses. *Prerequisite:* GEOG 103 or equivalent, or consent of instructor. 4 hours or 1 unit.

305. Zoogeography

Introduction to the principles of zoogeography; the central theme explains present distribution of animals, chiefly mammals. *Prerequisite:* GEOG 102 and 103, GEOL 102, BIOL 104, or consent of instructor. 3 hours or 1 unit.

306. Fluvial Geomorphology

Same as GEOL 306. Systematic overview of the forms and processes associated with rivers and drainage basins; topics include basin hydrology, drainage networks, river hydraulics, sediment transport processes, channel morphology, channel change, and human impacts on fluvial systems. *Prerequisite:* PHYS 101, and GEOG 103 or GEOL 107, or consent of instructor. 4 hours or 1 unit.

310. The Geography of Development and Underdevelopment

Patterns and processes of Third World development geography. Lectures and discussion draw upon theoretical and case study material by development geographers working in Asia, Africa, and Latin America. *Prerequisite:* GEOG 101, 110, and ECON 101 are highly recommended. 4 hours or 1 unit.

315. Physical Climatology

Surveys the basic concepts of energy balance climatology, with emphasis on the topoclimatic scale; lectures supplemented by calculations and field observations examining the effects of location and surface characteristics on determination of climate. *Prerequisite:* MATH 112, PHYS 101, and GEOG 102; and C S 103 or equivalent; or consent of instructor. 3 hours or 1 unit.

325. Historical Geography of American Landscapes to 1880

Same as LA 325. Changing patterns of spatial organization in the United States and Canada, circa 1400 A.D. to 1880; focuses on landscape patterns through time (especially the built environment), perception of relic landscapes in the present day, and contemporary preservation of historic areas as historic places. 4 hours or 1 unit.

326. Historical Geography of American Landscapes Since 1880

Same as LA 326. Review of the values and technologies which underlie the structuring of the American built environment during the past century; emphasizes the changing meaning of urban, suburban, small town, rural, and wilderness places in American life and is concerned with the image of place as a basis for historic preservation. 4 hours or 1 unit.

327. American Vernacular: The Cultural Landscape

Same as LA 327. Focuses on vernacular structures in the cultural landscape, especially common houses, barns, and commercial and industrial structures; examines origin and geographical diffusion of vernacular architecture in the United States. 4 hours or 1 unit.

338. Geography of Health Care

Same as SOC 338. Methods and perspectives of health care. Emphasizing the spatial analysis of health and health care. The organization, provision and competition of health care will be highlighted. *Prerequisite:* GEOG 284 or SOC 264 or consent of instructor. 3 hours or 1 unit.

341. Regional Environmental Management Simulation

Same as ACE 319, CEE and ENVST 341, and U P 375. See CEE 341.

346. Ecological Numeracy: Planning Analysis of Environmental Issues

Same as NRES and U P 346. See U P 346.

353. Geography of the U.S.S.R

Physical and cultural regionalism; a survey of natural resources and patterns of human occupancy including industry, agriculture, and transportation. 3 hours or ¾ unit.

355. Geography of Central and South Africa

Regional geography of Africa south of the Sahara. 3 hours or ¾ unit.

365. Transportation Systems and Spatial Development

Descriptors of transportation systems; allocation models; transportation as an industrial activity and public good; and transportation and spatial development, including the role of transportation in developing countries and in urban and regional development and problems involved in measuring the impact of transport investment. 3 hours, or ½ or 1 unit.

367. Dynamic Simulation of Natural Resource Problems

Same as ECON 367. Examines the development of the physically based theories of scarcity and a comparison to the historical and most recent economic theories of scarcity of critical resources, especially energy, and their expected application in local, regional, national, and international situations. *Prerequisite:* MATH 130 or equivalent; ECON 102 or 103, or equivalent; and ECON 300 or consent of instructor. 3 hours, or ¾ or 1 unit.

368. Biological Modeling

Same as CPSC, ANSCI, and BIOL 368. Interdisciplinary modeling course for students in-

terested in dynamic system modeling of living processes; each student will build a model by the end of the course. No special mathematical background required. *Prerequisite:* EEE 212, PLBIO 381, ENTOM 315, or equivalent, depending on curriculum. 3 hours or 1 unit.

369. Spatial Ecosystem Modeling

Same as BIOL and NRES 369. Students will build a spatial dynamic ecosystem computer model as a research team, focusing on a specific endangered species or ecosystem. *Prerequisite:* GEOG 368 or consent of instructor. 3 hours or 1 unit.

370. Introduction to Quantitative Methods in Geography

Introduction to statistical, numerical, and mathematical techniques used in geographic research; introduction to computer usage in geographic research. *Prerequisite:* GEOG 185, one year of college mathematics, or one course in statistics, or equivalent. 4 hours or 1 unit.

371. Recent Trends in Geographic Thought

Examines trends in geographic thought since 1950; gives attention to developments in positivism, phenomenology, and structuralism with regard to geographic research; introduces students to the research methodologies of the department's faculty. 2 hours or ½ unit.

372. Geographical Epidemiology

Same as CHLTH 375. See CHLTH 375.

373. Map Compilation and Construction

Instruction and practice in the basic techniques of map making followed by a consideration of problems involved in the construction of maps for presentation in a reproduced form (i.e., printed, photographed); the selection of proper source materials for the base and body of the map, the compilation and correlation of these materials, and methods of mechanical and photographic reproduction. 4 hours or 1 unit.

377. Introduction to Remote Sensing

Same as NRES 377. Fundamentals of energy-matter interaction mechanisms, and the manifestation of reflected and emitted radiation on photographs and images; introduces characteristics of aerial films and filters, electro-optical scanners, and digital processing are introduced; and emphasizes applications in environmental problems. *Prerequisite:* GEOG 277 or equivalent, GEOG 185 (beginning statistics) or equivalent, or consent of instructor. 3 hours or ¾ unit.

378. Techniques of Remote Sensing Image Analysis

Optical and digital information processing of imagery acquired from aircraft and satellite remote sensing platforms; includes systems design, mensuration theory, photographic enhancement techniques, and automatic digital classification for all of the standard sensor systems; and laboratory focusing on the design and implementation of information processing techniques with application limited to a survey of uses. *Prerequisite:* GEOG 370 and 377, or equivalent. 4 hours or 1 unit.

379. Principles of Geographic Information Systems

Introduces the concepts of digital cartographic data, spatial analysis methods, and process modeling. *Prerequisite:* GEOG 185 or 271 or equivalent. 3 hours or ¾ unit.

381. Modeling Earth and Environmental Systems

Same as ATMOS and GEOL 381. See ATMOS 381.

383. Urban Geography

Distribution, functions, and internal structures of cities; emphasizes contemporary metropolitan and central city problems. 3 hours or ¾ unit.

384. Migration and Spatial Interaction

Theories and models of migration; contemporary migration patterns; information flow and individual movement in geographic space; and individual level and aggregate models of spatial interaction. 3 hours or 1 unit.

391. Research in Geography

Detailed examination and discussion of the methods of initiating and executing research projects in human or physical geography (taught in separate sections); requires students to write a research proposal of a quality suitable for a graduate thesis. *Prerequisite:* GEOG 371; either graduate standing in geography or senior standing as a geography major and consent of department. 2 hours or ½ unit.

405. Seminar in Physical Geography

Advanced study of one of several topics that vary from semester to semester and include: (a) mathematical models/numerical analysis in physical geography; (b) problems in physical geography; and (c) professional seminar. *Prerequisite:* Advanced course work in physical geography and consent of instructor. ½ to 1 unit.

406. Urban and Regional Analysis

Same as U P 406. See U P 406.

456. Regional Science Methods: Economic and Demographic

Same as U P 456. Examines models of regional growth and development, including export base, input-output and econometric, cohort component and spatial interaction; emphasizes socioeconomic impact analysis and forecasting subnational economic and demographic change. *Prerequisite:* U P 406 or consent of instructor. 1 unit.

457. Seminar in Regional Science

Same as U P 457. Discusses advanced topics in regional science; prepares students for dissertation and thesis research, applied study for public agency, or other student research. *Prerequisite:* GEOG 456, ECON 461, or consent of instructor. 1 unit.

463. Historical Geography

History and philosophy of historical research in geography. Research strategies for the analysis of individual and aggregate spatial behavior in the past, derived geographical patterns, changing spatial behaviors and patterns through time, and historical values

underlying contemporary geographical decision making. 1 unit.

464. Problems in Historical Geography

Research seminar focused on the interests of participating students and faculty; application of geographic theory to the study of past geography, geographic change in the past, spatial behavior in the past, and/or evidence of spatial behavior in the contemporary scene. *Prerequisite:* GEOG 370 or equivalent; prior preparation in historical geography. 1 unit.

470. Advanced Spatial Analysis

Advanced techniques of spatial analysis, including spatial autocorrelation, trend surface analysis, grouping and regionalization procedures, and point pattern analysis. *Prerequisite:* GEOG 370 or equivalent. 1 unit.

483. Historical Ecology of Human Settlements

Same as L A and U P 483. See U P 483.

487. Qualitative Research Methodology

Same as U P 487. See U P 487.

494. Seminar in Social Geography

Advanced study of a current research topic in social geography. Topic varies from semester to semester; prepares students for dissertation and thesis research through study of advanced literature and the completion of a research paper. *Prerequisite:* GEOG 370 and 371, or equivalent; graduate course work in social geography or in one of the social sciences. 1 unit.

495. Advanced Studies in Geography

Seminar and directed individual investigation of selected problems or regions; designed to develop ability to conduct independent investigation. Scheduled seminars are detailed in each semester's *Timetable*. All students are required to register each semester in section Z (the departmental colloquium) for 0 units in addition to other 495 work which may be selected. 0 to 2 units.

499. Thesis Research

0 to 4 units.

GEOLOGY

Head of Department: Stephen Marshak
Department Office: 245 Natural History Building, 1301 West Green Street, Urbana
Phone: 333-3540
URL: www.geology.uiuc.edu

Geology (GEOL)**100. Planet Earth**

Introduces nonscience majors to physical aspects (earthquakes, volcanoes, floods, tsunamis, mountains, continental drift) and historical aspects (formation of earth and life, dinosaurs, ice age, evolution of climate) in earth science. Presents information on earth

resources, natural hazards, and development of natural landscapes. Focuses on humanistic issues; provides context for understanding environmental change. Optional lab demonstrations and field trips with co-registration in GEOL 110. 3 hours. Credit is not given for both GEOL 100 and 101, 107, or 111.

101. Introduction to Physical Geology

Focuses on physical features of our planet and their origin. Topics include: plate tectonics, mountain building, glaciers, earthquakes, volcanoes, coastlines, rivers, deserts, geologic structures, weathering, minerals, and rocks. Introduces fundamental methodology for observing and interpreting earth features. Intended for nonphysical science majors. 4 hours. Credit is not given for both GEOL 101 and 100, 107, or 111.

104. Geology of the National Parks and Monuments

Develops geologic background, concepts, and principles through study of selected national parks and monuments. Examines the geologic framework and history, modern geologic processes, and factors influencing the present day landscape for each park area. 3 hours. Optional field trips.

105. Geology of Energy Resources

Geology of fossil and nuclear fuels, geothermal energy, wind and water power, and exotic energy sources. History of energy production and use. Future supplies and predictions of availability. Politics and environmental effect on energy supply, extraction, and consumption. 3 hours.

107. General Geology, I

Introduces Earth phenomena and processes. Includes minerals and rocks, continental drift, plate tectonics, rock deformation, igneous and sedimentary processes, geologic time, landscape evolution, internal structure and composition of the earth, groundwater, seismology and earthquakes, and formation of natural resources. Emphasizes the chemical and physical aspects of the Earth, and the basis for geological inference. Field trip required for geology majors, optional for others. Intended for science and science-oriented students. 4 hours. Credit may not be received for both GEOL 107 and 101 or 111.

108. General Geology, II

Approaches to understanding the dynamic history of the Earth since its formation by analysis of sedimentary rock systems, evolution and life history, plate tectonic changes through time, and age determination methods. Laboratory work focuses on identification of sedimentary rocks, reconstructing sedimentary environments, fossil identification, and a field trip report. *Prerequisite:* GEOL 107 or consent of instructor. 4 hours. Field trip required. Primarily intended for science and science-oriented students.

110. Planet Earth—Lab/Field

Introduces practical techniques for identification of rocks, minerals, and fossils; interpretation of geologic maps and cross-sections; appreciation of Midwestern geologic history and geologic features and landforms in the

field. *Prerequisite:* Concurrent registration in or completion of any 100-level Geology course, or consent of instructor. 1 hour. Two field trips are required (a 1-day and a 3-day trip).

111. The Dynamic Earth (Honors)

Study of the geological history and evolution of the earth, the formation of mountains and ocean basins, the making of continents and earth environments and resources. Typically, a three to four-day field trip is required. Course in the Campus Honors Program. 4 hours. Credit may not be received for both GEOL 111 and GEOL 100, 101, or 107.

116. Geology of the Planets

Introduces nonscience majors to important geologic processes and their consequences on a planet-wide scale. Discusses systems of tectonic, volcanic, geochemical, and atmospheric cycles evolving through the past 4.5 billion years on the solid planets and satellites; the interrelationship between deep-seated and surficial processes; processes unique to the Earth and common to other terrestrial planets. 3 hours. Credit is not given for both GEOL 116 and ASTR 121.

117. The Oceans

Integrated introduction to oceanography and marine geology and geophysics. Topics include ocean-basin formation and evolution (in the context of plate tectonics), ocean ecology, the hydrologic cycle, water chemistry, currents and waves, the interaction of oceans with climate coastal hazards, resources, pollution, and the Law of the Sea. Course is oriented toward students not majoring in science. 3 hours.

118. Earth and the Environment

Interdisciplinary introduction to global environmental change oriented toward nonspecialists in science. Presents both earth science and ecological aspects related to global change, as well as discussion of human dimension of change. Topics include: greenhouse effect/global warming, carbon cycle, acid rain, geologic hazards (earthquakes, volcanoes, floods, landslides, subsidence, sinkholes, coastal erosion), and earth resources (including energy). 3 hours.

130. Illinois in the Changing Earth System

Same as ATMOS and GEOG 130. See ATMOS 130.

143. History of Life

Evolution of life from its beginning, illustrating changing faunas and floras through time; the invasion of land and of the skies; the effects of a changing atmosphere, changing climates, and continental drift. Emphasis on dinosaur evolution, ecology, and extinction; also other vertebrates, including mammal-like reptiles, mammals, and the emergence of humans, as well as plants and invertebrates. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

233. Earth Materials and the Environment

Studies structure and composition of organic and inorganic minerals, sediments, and rocks

emphasizing their role in understanding earth history and environmental issues. Topics include: asbestos, radon, health hazards in geology, acid rain, earth resources including soils and ore deposits. Required 1-day or 2-day field trip. *Prerequisite:* GEOL 100 and 110; or 101, 104, 107, or 111; and CHEM 101 and 105; or consent of instructor. 4 hours. Credit is not given for both GEOL 233 and GEOL 332. (Counts for advanced hours in L.A.S.)

250. Geology for Engineers

Physical geology with an emphasis on those aspects of the natural environment which are of importance to the engineer. *Prerequisite:* T A M 150 or 152; sophomore standing in the College of Engineering. 3 hours.

280. Environmental Geology

Analysis of both geologic phenomena that pose threats to society, and human activities that affect earth. Topics include: groundwater, surface water, and energy resources; geologic hazards (slope stability, subsidence, sinkholes, earthquakes, volcanoes, floods); geology of waste disposal. Required 1-day or 2-day field trip. *Prerequisite:* GEOL 100 and 110, or 101, 104, 107, 111, or 250. 4 hours.

290. Individual Study

Research and individual study in geology. *Prerequisite:* GEOL 108 or equivalent; consent of supervising faculty member. 1 to 4 hours. May be repeated. A maximum of 8 hours of GEOL 290 plus 291 may be counted toward graduation.

291. Individual Honors Study

Research and individual study in geology for honors credit. *Prerequisite:* GEOL 108 or equivalent; consent of supervising faculty member and of departmental honors adviser. 1 to 4 hours. May be repeated. A maximum of 8 hours of GEOL 290 plus 291 may be counted toward graduation.

292. Senior Thesis

Research in geology, with thesis; a thesis must be submitted for credit to be received. *Prerequisite:* Consent of supervising faculty member. 2 to 8 hours. May be repeated. A maximum of 10 hours of GEOL 292 plus 293 may be counted toward graduation. (Counts for advanced hours in L.A.S.)

293. Honors Senior Thesis

Research in geology with honors thesis; a thesis must be submitted for credit to be received. *Prerequisite:* Consent of supervising faculty member and of departmental honors adviser. 2 to 8 hours. May be repeated. A maximum of 10 hours of GEOL 292 plus 293 may be counted toward graduation. (Counts for advanced hours in L.A.S.)

301. Geomorphology

History, origin, and characteristics of land forms produced by weathering, fluvial, glacial, wind, and wave processes or by a combination of these acting upon the major kinds of geologic materials and structures. Lectures, laboratory, and field trips. *Prerequisite:* GEOL 108 or consent of instructor. 4 hours or 1 unit.

304. Soil Geomorphology

Same as GEOG 304. See GEOG 304.

306. Fluvial Geomorphology

Same as GEOG 306. See GEOG 306.

311. Structural Geology and Tectonics

Introduction to principles of rock deformation, stress, and strain; description and interpretation of geologic structures; study of methods for structural analysis; outline of geotectonic processes; three hours of lecture and a three-hour lab per week. Required four-day field trip. *Prerequisite:* GEOL 107 or consent of instructor. 4 hours or 1 unit.

315. Field Geology

Group field study in a prominent geologic locality; includes in-class meetings, student-led presentation, and field trip; trips run during spring break, winter break, or intercession; dates depend on location. *Prerequisite:* GEOL 108 or equivalent; junior or senior standing or consent of instructor. 2 to 8 hours, or ½ to 2 units. May be repeated.

317. Geologic Field Methods, Western U.S.

Field course based in the mountains of the western United States. Provides intensive practical experience in geologic mapping, as well as instruction in field structural, stratigraphic, geomorphologic, and petrologic analysis. Offered during summer session only. *Prerequisite:* Eight hours of 300-level credit in geology, including GEOL 340 or 332, or consent of instructor; GEOL 311 is recommended. 6 hours or 1½ units.

320. Introduction to Paleontology

Surveys the major groups of fossil forming invertebrates, vertebrates and plants, their modes of preservation, and basics of taxonomy; also their use in the study of functional morphology, ecology, evolution, and biogeography. *Prerequisite:* GEOL 108, or EEE 320, or consent of instructor. 3 hours or ¾ unit.

332. Mineralogy and Mineral Optics

Introduction to: crystallography; crystal optics; structures, compositions, properties, stabilities and geological occurrences of minerals; and mineral identification. *Prerequisite:* GEOL 108 and CHEM 102. 4 hours or 1 unit. Credit is not given for both GEOL 233 and GEOL 332.

333. Solar System Astrophysics

Same as ASTR 333. See ASTR 333.

336. Petrology and Petrography

Study of the minerals, compositions, textures, structures, classifications, and origins of igneous, sedimentary, and metamorphic rocks; lectures emphasize rock forming processes (petrology), and laboratories emphasize description and classification (petrography). *Prerequisite:* GEOL 332. 4 hours or 1 unit.

340. Sedimentology and Stratigraphy

Introduces dynamics of sedimentation, geology of sedimentary basins, the distribution of geologic processes through time, definition and correlation of stratigraphic units, principles of paleogeography, stratigraphy and tectonics. *Prerequisites:* GEOL 108, or consent of instructor. 4 hours or 1 unit.

350. Introduction to Geophysics

Same as ASTR 350. Introduces basic concepts related to physics of Earth's interior. Topics include formation of Earth; its composition, gravity, shape, internal temperature, and magnetism; seismology; plate tectonics; and geodynamics. *Prerequisite:* PHYCS 112 and MATH 242 or 245. 4 hours or 1 unit. Students may not receive credit for both GEOL 350 and 352.

351. Geophysical Methods for Geology,

Engineering and Environmental Sciences
Discusses nondestructive geophysical methods to reveal subsurface structures. Topics include seismic, gravity, magnetics, electrical methods, ground penetrating radar, borehole geophysics, and their applications to hydrocarbon and mineral exploration as well as engineering and environmental investigations. *Prerequisite:* PHYCS 112 and MATH 242 or 245. 4 hours or 1 unit. Several required local trips for field experiments.

352. Physics of the Earth

Survey of the physical and chemical principles used to delineate the physical state and evolution of the Earth including its internal structure, composition, and mineralogy. Topics include seismology, gravity, magnetic, heat flow, geophysical exploration, high-pressure mineralogy, and composition of the mantle and core. Students in geophysics, engineering, or physics should enroll in GEOL 350. *Prerequisite:* PHYCS 110 or 111, GEOL 332, credit or concurrent registration in GEOL 311, or consent of instructor. 3 hours or ¾ unit. Students may not receive credit for both GEOL 352 and 350.

355. Introductory Groundwater Hydrogeology

Introduction to environmental and economic aspects of the occurrence and movement of groundwater through the earth's crust; topics include the hydrologic cycle, groundwater contamination, petroleum migration, formation of mineral resources, and groundwater chemistry. *Prerequisite:* MATH 121 or 135, concurrent registration in CHEM 102 and 106 or CHEM 108 and 109 or consent of instructor. 4 hours or 1 unit.

360. Geochemistry

Fundamental chemical and physical concepts applied to geological processes; topics include: origin, distribution, and geochemical behavior of elements; chemical evolution of the Earth; geochemistry of natural waters and sedimentary rocks; isotope geochemistry, crystal chemistry, trace element geochemistry and organic geochemistry. *Prerequisite:* GEOL 101 or 107; CHEM 102 and 106; MATH 120 or 135; or consent of instructor. 3 hours or ¾ unit.

370. Oceanography

Investigation of the principal factors that control the origin and physiography of ocean basins; the composition and distribution of marine sediments; the composition, biological productivity, and dynamics of seawater. *Prerequisite:* GEOL 101 or 107, and CHEM 101 and 105, and MATH 120 or 135; or consent of instructor. 3 hours or ¾ unit.

380. Current Problems in Environmental Geology

Same as ENVST 380. Survey of geomechanics, groundwater hydrology, aqueous geochemistry, and related topics. Fundamental principles of each topic are introduced, and applications to currently important problems including natural hazards, well pumping, and waste disposal are discussed. *Prerequisite:* CHEM 102 and 106; PHYCS 101 or 111; MATH 130 or 245; GEOL 107; and senior standing; or consent of instructor. 4 hours or 1 unit.

381. Modeling Earth and Environmental Systems

Same as ATMOS and GEOG 381. See ATMOS 381.

397. Special Topics in Geology

Seminar or lectures in subjects not covered by regular course offerings; for advanced undergraduates and graduate students. *Prerequisite:* Consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated.

401. Physical Geochemistry

Introduction to geochemistry providing the background needed for more advanced courses in geochemistry, petrology, and mineralogy; topics, with geochemical examples, include classical thermodynamics, statistical thermodynamics, reaction kinetics, aqueous geochemistry, solid-state chemistry, and the theory of phase transformations. *Prerequisite:* CHEM 102 and 106 and MATH 242 or 245; or equivalent, or consent of instructor. 1 unit.

415. Advanced Field Geology

Field mapping or study in a selected region. Requires preparation of a geological map and/or report. *Prerequisite:* Consent of instructor. ½ or 1 unit. May be repeated.

421. Topics in Paleontology

Selected topics in macro- and micropaleontology. Intensive study of a selected invertebrate or algal group; special problems in the taxonomy, evolution, skeletal diagenesis, ecology, biogeography, and biostratigraphy of selected fossil organisms. *Prerequisite:* GEOL 320, EEE 320, or consent of instructor. 1 unit. May be repeated.

431. Structural Mineralogy

Crystal chemistry of minerals and survey of current knowledge about the structures and properties of selected minerals and mineral groups. *Prerequisite:* Consent of instructor. 1 unit.

432. Sedimentary Geochemistry

Equilibrium assemblages among the principal organic and inorganic sedimentary solids and their associated liquids during weathering, deposition, and diagenesis; kinetics and mechanism of phase changes; and transport processes during diagenesis. *Prerequisite:* GEOL 360 or equivalent, or consent of instructor; some background in physical chemistry desirable. 1 unit.

433. Isotope Geology

Introduction to the theoretical basis for isotopic fractionation in nature; survey of isotopic variations in natural materials; and application of isotopic variations to problems

of geological and environmental significance. *Prerequisite:* Consent of instructor. 1 unit.

435. Igneous and Metamorphic Petrology

Application of chemistry and physics to the study of crystalline rocks, with emphasis on the integration of theory with field and laboratory observations; topics selected on the basis of student interest and training. *Prerequisite:* GEOL 336. 1 unit. May be repeated.

437. Basin Analysis and Sedimentary Geology

Examines contemporary aspects of tectonics and sedimentation, cratonic sequences, seismic stratigraphy, geologic history of sea level, isotope chronostratigraphy, anoxic sedimentation, pelagic deposition, transgressive-regressive sequences, rates of sediment accumulation, sediment yield, maturation of organic sediments, global sedimentary cycles, basin classification, basin geodynamics, and examples of basin analysis. *Prerequisite:* GEOL 311, 340, 352, and 360; or equivalent; or consent of instructor. Consent of instructor required for students from other departments. 1 unit.

439. Carbonate Sedimentology

Study of genesis and diagenesis of carbonate sediments covering: carbonate deposition, coordination of ultrastructural-petrographic properties and elemental-isotopic composition, nature and environments of diagenetic changes, and temporal trends in carbonates. *Prerequisite:* GEOL 320 and 336, or equivalent; or consent of instructor. 1 unit.

440. Petroleum Geology

Application of geoscience to understanding the nature and occurrence of hydrocarbon resources. Emphasis will be on: source-rock geology and geochemistry, process of petroleum migration, nature of reservoirs and traps, exploration and drilling procedures, interpretation of seismic-reflection profiles, cross-section and sub-surface map construction, classification and tectonics of petroleum-bearing sedimentary basins, application of sequence stratigraphy to exploration, and petroleum-related environmental issues. *Prerequisite:* GEOL 311 and 340, or equivalent. 1 unit.

450. Principles of Engineering Geology

Study of the effects that lithology, weathering, joints, faults, and ground water have upon engineering projects; the description and origin of geologic factors and their significance in the design, construction, and performance of civil engineering undertakings. *Prerequisite:* GEOL 250 or equivalent, or consent of instructor. 1 unit. Field trip or term paper required.

451. Practice of Engineering Geology

Review of modern geotechnical exploration techniques (borings, downhole logging, surface geophysics, and remote sensing) and study of case histories illustrating the influence of significant geologic features on exploration design, construction, and performance of civil engineering projects. *Prerequisite:* GEOL 450 and CEE 383, or consent of instructor. 1 unit. Field trip or term paper required.

452. Geodynamics

The dynamical characteristics of the solid earth will be addressed in this course. Mathematical theories that describe large scale deformation, both on the surface and within the interior of the earth, will be developed. Theoretical predictions will be compared with observations to delineate: the internal properties of the earth; driving mechanism of plate tectonics and the origin of various geological processes such as volcanism, mountain building and basin formation. *Prerequisite:* MATH 285, PHYS 111, GEOL 350, or consent of instructor. 1 unit.

455. Hydrogeology

The occurrence, storage, and movement of water within sediments and rocks, with emphasis on quantitative aspects of physical hydrologic theory; topics include flow modeling, heat transport and mass transfer, groundwater contamination, and the role of fluid migration within the earth's crust in geologic processes. *Prerequisite:* GEOL 355, CEE 357, or consent of instructor. 1 unit.

458. Geochemical Reaction Analysis

Study of the chemical processes affecting fluids, sediments, and rocks of the earth's crust, with emphasis on the inorganic geochemistry of groundwater and the development and application of quantitative reaction models. *Prerequisite:* GEOL 360, 401, or 432, or CEE 343 or 440, or consent of instructor. 1 unit.

459. Isotope Hydrogeology

Application of isotope measurements in hydrogeology. Groundwater age dating, stable isotope ratios and anthropogenic radionuclides will be considered in the context of studying a broad range of hydrologic problems, from siting of nuclear waste disposal to understanding the migration of groundwater in sedimentary basins. *Prerequisite:* GEOL 355 or 433, CEE 357, or consent of instructor. 1 unit.

461. Mineralogy of Clays

Same as CER E and MATSE 426. Composition of various types of clays; the structure and properties of the clay minerals; and the origin and mode of occurrence of the clay minerals and clay materials. *Prerequisite:* GEOL 332 or equivalent; consent of instructor. 1 unit. Field trip required.

462. Petrology of Clay Minerals

Same as CER E and MATSE 427. Origin and occurrence of clay minerals in natural and synthetic systems such as the weathering, sedimentary, burial diagenetic, and hydrothermal environments; quantitative X-ray diffraction analysis of mineral assemblages from each environment; advanced analytical techniques such as nuclear magnetic resonance and transmission electron microscope analysis of clay minerals. *Prerequisite:* GEOL 461. 1 unit.

488. Advanced Structural Geology

Study of selected topics concerning rock deformation processes and products. Course will introduce students to current research literature and methods, and to the techniques of structural analysis. *Prerequisite:* GEOL 311 or equivalent. 1 unit.

489. Geotectonics

Discussion of plate tectonics theory, and nature and distribution of regional-scale earth structures, such as mountain belts; includes study of geological and geophysical evidence that led to modern interpretations of evolution of earth's lithosphere. *Prerequisite:* GEOL 311 or consent of instructor. 1 unit.

493. Advanced Studies in Geology

Work may be taken in the following fields: (a) general geology; (b) engineering geology; (c) geomorphology and glacial geology; (d) clay mineralogy; (e) ground-water geology; (f) micropaleontology; (g) mineral deposits; (h) mineralogy and crystallography; (i) paleontology; (j) geochemistry; (k) geophysics; (l) petrography and petrology; (m) sedimentology; (n) stratigraphy; (o) oceanography; (p) submarine geology; (q) structural geology and geotectonics; (r) mathematical geology; (s) sedimentary petrography; (t) petroleum geology; (u) coal geology; (v) isotope geology and geochronology; (w) electron beam analysis; (x) vulcanology; (y) environmental geology; and (z) planetology. ¼ to 2 units.

499. Thesis Research

Individual research under supervision of members of the faculty in their respective fields. 0 to 4 units.

GERMAN

(See Germanic Languages and Literature)

GERMANIC LANGUAGES AND LITERATURE

Head of Department: Marianne E. Kalinke
Department Office: 3072 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 333-1288
URL: www.german.uiuc.edu

Including German (GER), Germanic (GMC), Scandinavian (SCAN), and Yiddish (YDSH)

German (GER)

101. Elementary Course

Oral practice, reading, and grammar for beginners. 4 hours.

102. Elementary Course

Continuation of GER 101. *Prerequisite:* One semester of college German or equivalent. 4 hours.

103. Intermediate Course

Continuation of GER 102. *Prerequisite:* Two semesters of college German or equivalent. 4 hours.

104. Intermediate Course

Continuation of GER 103. *Prerequisite:* Three semesters of college German or equivalent. 4 hours.

189. Living German—German Living

Practice in speaking German for students living in the German House. *Prerequisite:* Elementary speaking knowledge of German. 1 hour. May be repeated to a maximum of 3 hours.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. German Literature in Translation

Same as C LIT 224. Introduction to German literature for students with no knowledge of German. 3 hours. May be repeated as topics vary.

211. Conversation and Writing

Prerequisite: GER 104 or equivalent, or consent of instructor. 3 hours.

212. Conversation and Writing

Continuation of GER 211. *Prerequisite:* GER 211 or equivalent, or consent of instructor. 3 hours.

220. German for Business

Introduces German business language as used in basic operations in retail/wholesale, export/import, banking transactions. *Prerequisite:* GER 211 or consent of instructor. 3 hours. (Counts for advanced hours in L.A.S.)

221. German for Economics

German language as used in professional contexts involving economic matters: texts and documents relating to forms of enterprises and their financing, to macroeconomic structures of domestic and foreign trade, and to reports on the economies of German-speaking countries. *Prerequisite:* GER 220 or consent of instructor. 3 hours. (Counts for advanced hours in L.A.S.)

231. Introduction to German Literature, I

Introductory study of representative works (prose, drama, lyric) by outstanding German, Austrian, and Swiss writers of the modern period. *Prerequisite:* Two years of college German or equivalent. 3 hours.

232. Introduction to German Literature, II

Introductory study of representative works (prose, drama, lyric) by outstanding German, Austrian, and Swiss writers of the modern period. *Prerequisite:* GER 231 or equivalent. 3 hours.

250. Grimms' Fairy Tales in Their European Context

Same as C LIT 250 and ENGL 267. Special attention is paid to the Grimms' tales in terms of traditional narrative genres, elements of life in early modern Europe, and versions from Italy and France as well as Germany. Course is conducted in English. 3 hours.

260. The Holocaust in Context

Jewish contributions to German Literature from 1200 to the present day. Includes trips to the University Library's Rare Book Room. *Prerequisite:* Completion of the Campus Composition I general education requirement. 3 hours.

271. Introduction to Second Language Learning and Teaching

Same as FR, HUMAN, LAT, RUSS, and SPAN 271. See SPAN 271.

275. Developing and Implementing Communicative Language Teaching

Same as FR, LAT, RUSS, and SPAN 275. See SPAN 275.

278. Current Issues in Secondary Language Teaching

Same as FR, LAT, RUSS, and SPAN 278. See SPAN 278.

293. Honors Senior Thesis

Intended primarily for candidates for honors in German, but open to other seniors. *Prerequisite:* Senior standing; consent of instructor. 1 to 4 hours. May be repeated to a maximum of 4 hours. (Counts for advanced hours in L.A.S.)

296. Special Topics in German Literature

Same as C LIT 228. Introductory study in such topics as individual authors, selected literary movements or periods, modes of inquiry in literary study, minor genres, subgenres, extraliterary influences, etc. *Prerequisite:* Reading fluency in German beyond the fourth-semester college level. 3 hours. May be repeated as topic varies to a maximum of 6 hours.

299. Study Abroad

Lectures, seminars, and practical work in German language, literature, civilization, and in other academic areas appropriate to the student's course of study. *Prerequisite:* GER 104 or equivalent; 2.75 overall average; 3.0 average in German courses. 0 to 17 hours. May be repeated to a maximum of 34 hours per academic year.

301. Current Issues in German Media

Introduction to current issues in German media (in German). *Prerequisite:* GER 212 or equivalent. 3 hours or ¾ unit.

302. German Stylistics

Intensive study of problems of advanced German style with emphasis on written practice. *Prerequisite:* GER 301, or equivalent. 3 hours or ¾ unit.

303. Translation in Theory and Practice

Theory and practice of translating technical, commercial, scientific, and literary texts from German into English and vice versa. *Prerequisite:* GER 301 or consent of instructor. 3 hours or ¾ unit.

320. History of German Civilization

Selected topical, historical, and pictorial analysis of Germany's culture and civilization. *Prerequisite:* GER 232 or equivalent. 4 hours or ¾ unit.

360. Principles of Language Testing

Same as E I L, FR, ITAL, PORT, and SPAN 360. See E I L 360.

365. Structure of the German Language, I (Phonology and Morphology)

Introductory survey of the phonological and morphological structure of the German language. *Prerequisite:* Three years of college German or equivalent. 3 hours or ¾ unit.

366. Structure of the German Language, II (Syntax)

Introduction to German syntax; theory and practical applications. *Prerequisite:* GER 365 or consent of instructor. 3 hours or ¾ unit.

370. German Literature: The Middle Ages to the Baroque (750–1720)

Literary, thematic, cultural, and bibliographical analysis of the major authors, works, genres, and movements in GER literature from 750–1720. *Prerequisite:* GER 232 or equivalent. 3 hours or ¾ unit.

371. German Literature: The Enlightenment to Romanticism (1720–1830)

Literary, thematic, cultural, and bibliographical analysis of the major authors, works, genres, and movements in German literature from 1720 to 1830. *Prerequisite:* GER 232 or equivalent. 3 hours or ¾ unit.

372. German Literature: Realism to Expressionism (1830–1920)

Literary, thematic, cultural, and bibliographical analysis of the major authors, works, genres, and movements in German literature from 1830 to 1920. *Prerequisite:* GER 232 or equivalent. 3 hours or ¾ unit.

373. German Literature: The Twenties to the Present

Literary, thematic, cultural, and bibliographical analysis of the major authors, works, genres, and movements in German literature from 1920 to the present. *Prerequisite:* GER 232 or equivalent. 3 hours or ¾ unit.

374. Poetics (Genre)

Study of poetic forms and genres such as poems, short stories, novellas, novels, dramas, in their historical development from the classical to the modern period illustrated by typical examples. *Prerequisite:* GER 232 or equivalent. 3 hours or ¾ unit.

380. Classroom Language Acquisition

Same as E I L, FR, ITAL, PORT, and SPAN 380. See SPAN 380.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E I L, FR, HUMAN, ITAL, PORT, SLAV, and SPAN 382, and LING 386. See HUMAN 382.

389. Theoretical Foundations of Second Language Acquisition

Same as FR 381, and E I L, ITAL, LING, PORT, and SPAN 389. See E I L 389.

390. The German Cinema

Same as CINE 391. History and criticism of the German film from its beginnings through Expressionism and the New Objectivity of the

1920s, the Third Reich and the period of decline, to the young German film of the 1960s; weekly film screenings, lectures, and discussions. 3 hours or ¾ unit. Knowledge of German useful but not required.

396. Special Topics in German Studies

Intensive study of restricted topics in German language, literature, and culture. *Prerequisite:* Three years of college German or equivalent. 3 hours or ¾ unit. May be repeated as topics vary to a maximum of 9 hours or 2¼ units.

400. Beginning German for Graduate Students

Introduction to the reading of German texts in the sciences and the humanities. 4 hours. No graduate credit.

401. Readings in German for Graduate Students

Designed for graduate students preparing for the German reading requirements for the Ph.D. *Prerequisite:* GER 400 or equivalent. 4 hours. No graduate credit.

410. Introduction to Graduate Study

Bibliography and methodology of the study of the Germanic languages and literatures, with particular regard to German literature and Germanic linguistics; introduction to scholarship in general and the German profession in particular, including the modes and methods of scholarly endeavor. 1 unit.

415. Middle High German

1 unit.

420. History of the German Language

Internal and external history of German from prehistoric times to the present. *Prerequisite:* GER 365 or equivalent. 1 unit.

430. Old High German

Grammar and interpretation of the oldest literary documents. *Prerequisite:* GER 365. 1 unit.

463. College Teaching of Foreign Languages

Same as E I L, FR, ITAL, PORT, RUSS, and SPAN 463. See FR 463.

470. Studies in Critical Theory

Same as C LIT 411. Critical introduction to the enterprise of reading, accompanied by an overview of this century's most important theories of literature and criticism. *Prerequisite:* GER 410 or equivalent, and reading knowledge of German, English, and one other modern European language. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

471. Studies in Medieval German Literature

Seminar in selected genres, themes, or authors of the Middle Ages. Epic, lyric, and didactic works in prose and verse are read in the original language. *Prerequisite:* GER 410 and 415 or equivalent, or consent of instructor. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

472. Studies in Early Modern German Literature

Seminar in selected genres, themes, or authors of the early modern period (1500-1700). *Prerequisite:* GER 370 or graduate standing. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

473. Studies in Eighteenth-Century German Literature

Seminar in selected genres, themes, or authors of the eighteenth century. *Prerequisite:* GER 320 or 371. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

474. Studies in Nineteenth-Century German Literature

Seminar in selected genres, themes, or authors of the nineteenth century. *Prerequisite:* Two 300-level courses in German literature or equivalent. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

475. Studies in Twentieth-Century German Literature

Seminar in selected genres, themes, or authors of the twentieth century. *Prerequisite:* Two 300-level courses in German literature or equivalent. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

476. Open Seminar in German Studies

Seminar in literary phenomena (such as movements, genres and forms, relations, themes and types, interdisciplinary studies, women's studies) that go beyond the confines of a particular century. *Prerequisite:* GER 410. 1 unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

480. Teaching German in College

Introduction to the problems of teaching German in college. ½ unit.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as E 1 L, FR, ITAL, PORT, RUSS, and SPAN 481. See FR 481.

488. Seminar in Second Language Learning

Same as ITAL, PORT, and SPAN 488. See SPAN 488.

493. Research in Special Topics

¼ to 2 units. May be repeated to a maximum of 2 units.

499. Thesis Research

0 to 4 units.

Germanic (GMC)**199. Undergraduate Open Seminar**

1 to 5 hours. May be repeated.

426. Gothic

Synchronic and diachronic study of the Gothic language and its relationship to other Germanic and Indo-European languages; extensive reading of extant texts. *Prerequisite:* Consent of instructor. 1 unit.

462. Seminar in Germanic Linguistics

Varying topics dealing with problems in diachronic and synchronic Germanic linguistics. *Prerequisite:* Consent of instructor. 1 or 2 units. May be repeated as topics vary.

Scandinavian (SCAN)**101. Elementary Scandinavian, I**

First of four semesters leading to a reading knowledge of Danish, Norwegian, or Swedish, and to an oral command of one of these languages; linguistic structure, reading, and oral practice. 4 hours.

102. Elementary Scandinavian, II

Continuation of SCAN 101. Oral practice and reading of simple texts. *Prerequisite:* SCAN 101. 4 hours.

103. Intermediate Scandinavian, I

Readings in Danish and Norwegian, or in Swedish; structure of Swedish, or of Danish and Norwegian. *Prerequisite:* SCAN 102 or equivalent. 4 hours.

104. Intermediate Scandinavian, II

Continuation of SCAN 103. Readings in classical and modern Danish, Norwegian, or Swedish texts. *Prerequisite:* SCAN 103. 4 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

215. The Scandinavian Novel: Masterpieces in English Translation

Same as C LIT 215. Works by Jacobsen, Strindberg, Vesaas, Myrdal, and Nobel Prize winners Hamsun, Undset, Lagerkvist, and Johnson; readings and discussion in English. 3 hours.

251. Viking Mythology

Same as RELST 251. Studies pre-Christian beliefs of the Germanic peoples as reflected primarily in medieval Icelandic prose and poetry (in translation). 3 hours.

252. Viking Sagas in Translation

Same as C LIT 252. Studies Old Norse-Icelandic literature: kings' sagas, family sagas, mythical-heroic sagas, and romances. Texts and lectures in English. 3 hours.

293. Honors Senior Thesis

Prerequisite: Senior standing; consent of instructor. 2 to 4 hours. May be repeated to a maximum of 4 hours. (Counts for advanced hours in L A S.)

363. Ibsen in Translation

Same as C LIT and THEAT 363. Ibsen's major plays: *Brand*, *Peer Gynt*, and the entire prose cycle from *Pillars of Society* to *When We Dead Awaken*. *Prerequisite:* One college-level literature or theatre course, or consent of instructor. 3 hours or 1 unit.

364. Strindberg in Translation

Same as C LIT and THEAT 364. Major dramas illustrating Strindberg's evolution from Naturalism to Expressionism and one cycle of historical plays; some attention to prose, both autobiographical and non-autobiographical. *Prerequisite:* One college-level literature or theatre course, or consent of instructor. 3 hours or 1 unit.

ture or theatre course, or consent of instructor. 3 hours or 1 unit.

375. Women and Society in Scandinavian Literature

Same as C LIT and W S 375. Survey of how women and their social roles are portrayed in Scandinavian literature, primarily of the nineteenth and twentieth centuries. Readings and discussion in English. *Prerequisite:* One college-level literature course or one course in women's studies, or consent of instructor. 3 hours or ¾ units.

390. The Films of Ingmar Bergman

Same as CINE 390. Focuses on Bergman's major films of the late 1950s and 1960s; involves reading screenplays and extensive criticism in addition to viewing the films; and includes important artistic influences on Bergman as well as his own significance as a major twentieth-century artist. Knowledge of Swedish not required. 3 hours or ¾ unit.

392. Swedish Cinema

Same as CINE 392. Survey of Sweden's major film movements, genres, and directors. Weekly lectures, discussions, and screenings of representative films from the silent era to the present. *Prerequisite:* One college-level film or literature course, or consent of instructor. 3 hours or ¾ unit.

396. Special Topics in Scandinavian Studies

Individual study in selected topics, such as individual authors, literary movements, periods, genres, or themes, and Scandinavian culture. *Prerequisite:* Consent of instructor. 2 to 4 hours, or ½ to 1 unit. May be repeated.

405. Old Norse-Icelandic, I

Grammar and selected readings. 1 unit. Offered in alternate years.

406. Old Norse-Icelandic, II

Readings; selections from the Elder Edda and the sagas. *Prerequisite:* SCAN 405. 1 unit. Offered in alternate years.

Yiddish (YDSH)**101. Elementary Yiddish, I**

Course develops basic conversational and reading skills as well as the essentials of Yiddish grammar. 4 hours.

102. Elementary Yiddish, II

Continuation of YDSH 101 focusing on comprehension and reading skills. *Prerequisite:* YDSH 101. 4 hours.

120. Jewish Storytelling: From the Russian Shtetl to New York

Same as ENGL 123 and RELST 131. Course will introduce the great Jewish storytellers such as Nachman of Bratslav, Scholem-Aleichem, and I.B. Singer through readings of Yiddish tales, short stories, poetry, drama and excerpts from novels and autobiographies from the 19th and 20th centuries. In addition, Yiddish films and folklore will be used to exemplify the variety of Jewish cultural expression in Eastern Europe, Russia, and America. Course will also present a sample

of critical approaches to Yiddish literature. 3 hours. Taught in English translation.

220. Jewish Literary Responses to the Holocaust

Same as ENGL 288 and RELST 220. Course introduces a variety of Jewish literary responses to the Holocaust written during and after the Second World War (from 1939). The discussion of Holocaust memoirs, diaries, novels, short stories, poems, and other texts will focus on the unique contribution of literary works to our understanding of the Holocaust. In addition, the works and their authors will be situated in their Jewish cultural historical context. Taught in English translation. 3 hours.

GRADUATE COLLEGE

Interim Dean of College: Tony G. Waldrop
College Office: 202 Coble Hall, 801 South Wright Street, Champaign
Phone: 333-0034
URL: www.grad.uiuc.edu

Graduate College (G C)

399. Graduate College Study Abroad

Provides campus credit for study at accredited foreign institutions or approved overseas programs. Final determination of credit granted is made after the student's successful completion of work. Credit will not count toward residence requirements. *Prerequisite:* Full academic standing in the Graduate College and consent of major department, Graduate College, and Study Abroad office. 0 to 16 hours, or 0 to 4 units.

499. Thesis Research

For doctoral students who have completed the credit requirements for the doctorate, have passed the preliminary examination, and are eligible to register for 499 in their own academic units. 0 units.

GRAPHIC DESIGN

(See Art and Design, School of)

GREEK

(See Classics)

HEBREW

(See Linguistics)

HINDI

(See Linguistics)

HISTORY

Chair of Department: James R. Barrett
Department Office: 309 Gregory Hall, 810 South Wright Street, Urbana
Phone: 333-1155
URL: www.history.uiuc.edu

History (HIST)

110. COMP II/Western Civilization from Antiquity to 1660

Course is identical to HIST 111 except for the additional writing component. See HIST 111. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours. Credit is not given for both HIST 110 and 111.

111. Western Civilization from Antiquity to 1660

Fundamental developments—social, economic, cultural, intellectual, and political—in the history of mankind and Western society before 1660; includes the Greek and Roman world, the German migrations, the rise of cities and the commercial revolution, medieval art, universities, and heresies, the Renaissance and Reformation, the Puritan Revolution, and the beginnings of the modern world. 3 hours. Credit is not given for both HIST 111 and 110.

112. Western Civilization from 1660 to the Present

Fundamental developments—social, economic, cultural, intellectual, and political—in the history of mankind and Western society since 1660; includes the rise of modern science, the French and Industrial revolutions, the Romantic movement, the growth of nationalism and socialism, imperialism, urbanization, the Russian Revolution, Nazi Germany, the world wars, and the West and the underdeveloped world. 3 hours. Credit is not given for both HIST 112 and 113.

113. COMP II/Western Civilization from 1660 to the Present

Course is identical to HIST 112 except for the additional writing component. See HIST 112. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours. Credit is not given for both HIST 113 and 112.

120. A History of Judaism

Same as RELST 120. See RELST 120.

150. COMP II/History of the United States to 1877

Course is identical to HIST 151 except for the additional writing component. See HIST 151. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours. Credit is not given for both HIST 150 and any one of the following: HIST 151, 260, or 261.

151. History of the United States to 1877

Colonial foundations, movement for independence, and early years of the republic. 3 hours. Credit is not given for both HIST 151 and any one of the following: HIST 150, 260, or 261.

152. History of the United States, 1877 to the Present

Evolution of an industrial, urbanized, and pluralistic society, grappling with domestic and global problems. 3 hours. Credit is not given for both HIST 152, and either 153 and 262.

153. COMP II/History of the United States, 1877 to the Present

Course is identical to HIST 152 except for the additional writing component. See HIST 152. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours. Credit is not given for both HIST 153 and either HIST 152 or 262.

160. Comparative Environmental History: People, Crops, and Capital

Same as ENVST 160. Exploration of the extent and variety of relations between people and the environment, with special emphasis on pre-capitalist land use systems, illustrated with examples from the Midwest United States, tropical Africa, and tropical South America; the impact during the nineteenth and twentieth centuries of global capitalism; and a discussion of contemporary environmental concerns, starting with questions of land use. 3 hours.

168. Introduction to the Civilization of India

Same as ANTH 168. Multidisciplinary introduction to the civilizations of South Asia from the Indus Valley civilization to the present including the development of Hinduism, Buddhism and Indian Islam, state systems, arts and literature, social organization and daily life. 3 hours.

170. East Asian Civilizations: China, Japan, Korea

Same as EALC 170. Surveys the three major East Asian civilizations from ancient and classical times, through the period of Western influence, political revolution, and modernization, to the contemporary age and the emergence of East Asian superpowers. 3 hours.

172. Southeast Asian Civilizations
Same as ANTH and AS ST 186. See ANTH 186.

173. History and Civilization of the Islamic Middle East, 7th-20th Centuries C.E.
Introduction to fourteen centuries of Middle East history from the rise of Islam to modern times. Examines the development of Islamic thought, and of religious, social, and political institutions, as well as the transformations of the 19th and 20th centuries, in the area consisting of Egypt, the Fertile Crescent, Arabia, Turkey, and Iran. 3 hours.

175. Latin America from Conquest to Independence
Survey of Latin American history from the discovery of America to 1824. 3 hours.

176. Modern and Contemporary Latin America
History of the Latin American republics from their independence to the present; emphasis on Argentina, Brazil, Chile, Colombia, Cuba, and Mexico. 3 hours.

177. History of Africa
Survey of the early history of the continent, nineteenth century developments, and the period of colonial occupation and independence, with particular focus on case studies from East Africa, South Africa and West Africa at the conclusion of the semester. 3 hours.

181. The Ancient World
Ancient empires and Greece. 3 hours.

182. The Ancient World
Rome. 3 hours.

191. Freshman Honors Tutorial
Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

198. Freshman Seminar
Through research, reports, and discussion in a selected field of historical study, the seminar provides a thorough understanding of the problems of that field and of the methods of history as a discipline. *Prerequisite:* James Scholar standing or other designation as a superior student; consent of instructor. 3 to 4 hours. May be repeated to a maximum of 6 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

200. Topics in Film and History
Same as CINE 200. Examines films as a significant medium of commentary on society and history. Explores the motives and careers of moviemakers, the ways in which films are influenced by their audiences, and how audiences perception of historical processes are affected by films. Topics will vary. *Prerequisite:* A course in History and/or a course in Cinema Studies. 3 hours.

202. Women and Gender in Pre-Modern Europe
Same as W S 202. Examines the history of women and the evolution of concepts of

gender in western Europe from roughly 400 to 1700. Topics include the interactions of class and ethnicity with women's experiences, the social construction of sexuality and gender, the misogynist tradition and women's self-images. 3 hours.

203. The Age of Localism: The Early Middle Ages
Failure of imperial Rome and the rise of the Church; the organization of European society on a local basis through manorialism and feudalism. 3 hours.

211. The Contemporary World: Political, Ideological, and International Forces
Interpretation of the contemporary world covering the legacy of imperialism, militarism, and world politics, the revolt of the masses, the totalitarian state, nationalism, internationalism, and such related topics. 3 hours.

212. The Contemporary World: Economic, Social, and Cultural Aspects
Interpretation of the contemporary world covering the economics of global power, ideological and social forces, the individual and the modern mind, the collective society, the personality in history, and such related topics. 3 hours.

215. History of North and West Africa
Survey of major themes and events in the history of North and West Africa from prehistoric times and the peopling of Africa through the advent of Islam; North and West African empires and states in the medieval period; the arrival and departure of European colonial powers; and the re-emergence of independent African states. *Prerequisite:* HIST 177 or consent of instructor. 3 hours.

216. History of East and Southern Africa
Survey of major themes and events from the Bantu migrations and the rise of Aksum through the development of states and empires, Islam, the expansion of trade, European colonial rule, nationalism, and the persistence of white domination in the south. *Prerequisite:* HIST 177 or consent of instructor. 3 hours.

219. Survey of Russian History from Early Times to the Present
Main themes and problems of Russian history from earliest times to the present. 3 hours.

222. Traditional China
Same as EALC 222. Historical background to the modern age, tracing the Chinese state and empire from the earliest times until 1644 A.D. Basic political, social, and economic patterns; cultural, intellectual, and technological achievements; and China's impact on Asia and the world. 3 hours.

223. Modern China
Same as EALC 223. General introduction to the major themes of the Chinese Revolution from 1840 to the present, emphasizing the interplay between politics, ideas, and culture. Themes include the tension between cultural integrity and Western ideologies, between democratic participation and the tradition of centralized control, and the representation of

cultural identity in high and mass cultures. 3 hours.

224. Chinese Thought from Confucius to Mao
Same as EALC and RELST 224. Examination of China's principal philosophical, religious, and political schools of thought—such as Confucianism, Taoism, Zen Buddhism, and Maoism—as ways of understanding one of the world's major civilizations; the period of the classical philosophers, the glory years of empire, and the troubled era of Western contact receive approximately equal attention. 3 hours.

231. British Isles to 1688
Survey of the political, social and economic, religious, and cultural history of the British people from the "prehistoric" era through the revolution of 1688. 3 hours.

232. The History of Great Britain since 1688
Survey of all significant facets—political and constitutional, social and economic, diplomatic and imperial, religious, and cultural—of the life of the people of the British Isles during the past three centuries. 3 hours.

242. Nature and American Culture
Same as L A 216, LEIST and NRES 242. See LEIST 242.

245. Technology in Western Society
Explores the role of technology as a transforming social force; examines innovations from the stirrup and heavy plow to the airplane and computer, that restructured economic and political life and realigned values; examines cultural representations of technology. 3 hours.

247. Science in Western Civilization, I
Intellectual and social history of science from antiquity through the Enlightenment; special emphasis on the scientific revolution of the seventeenth century. 3 hours.

248. Science in Western Civilization, II
Topics in the intellectual and social history of modern science, 1789 to the present. 3 hours.

249. History of Western Medicine
Rise and development of medicine in the West since the sixteenth century; interrelations of physiology, pathology, and social demands with the theory and practice of medicine; pattern of professionalization; social role of the physician; conflict among ideas of medicine as an art, a science, and a social service; and problems of mental illness, medical ethics, and nontraditional forms of practice. *Prerequisite:* One year of college biology or chemistry, one year of college history, or consent of instructor. 3 hours.

250. United States History of Medicine
Same as W S 260. Medicine and public health from the colonial period through the twentieth century; health care providers, patients, and public policy; incorporates issues of race and sex. 3 hours.

251. Mexican Americans: Ethnicity, Culture, and Identity in the United States
Same as LLS 251. Examination of the history of Mexican Americans living within the

United States from the Spanish Conquest to the twentieth century. Explores the process of migration, settlement, assimilation, and discrimination with emphasis on continuity and change in Mexican cultural development. 3 hours.

252. Caribbean Latina/Latino Migration: Puerto Ricans, Cubans, and Dominicans in the United States

Same as LLS 252. Study of the economic, political, and social forces which shaped migration settlement and community formation of Puerto Ricans, Cubans, and Dominicans living in the United States. 3 hours.

253. Afro-American History to 1877

Same as AFRO 253. History of Africans in the Americas, surveying the African slave trade, slavery in the European colonies of the Americas, early United States slavery, and the Afro-American in the Civil War and Reconstruction. 3 hours.

254. Afro-American History Since 1877

Same as AFRO 254. History of Afro-Americans in the age of white supremacy; the rise of modern protest organizations; the era of integration; and the black power movement. 3 hours.

255. New England, 1620-1789

Founding of the New England colonies and their development through the period of the American Revolution. 3 hours.

256. Native Americans in the United States Before 1850

Survey of the Native American experience in North America from the arrival of Europeans to 1850. Explores the impact of European expansion on Native American communities, the ways in which Native American people adapted to the growing European presence, and the continuities and innovations that distinguished the indigenous world in this era. Focuses primarily on those parts of North America that became part of the United States. 3 hours.

257. Native Americans in the United States Since 1850

Overview of the Native American experience in the United States from 1850 to the present. Using lectures, classroom discussions, visual presentations and group projects, the course will explore the major events that altered the environment Native Americans inhabited following the establishment of the United States as a continental power. Course will also examine the ways in which native peoples survived amidst the economic, political, and social forces that were unleashed by the country's evolution into a modern nation state. Readings will include primary documents, Native American commentaries, historical fiction, and secondary works. 3 hours.

260. Colonial Beginnings and Early United States History to 1815

Social, economic, and political survey of the region and its relation to the evolving Atlantic community. 3 hours. Credit is not given for both HIST 260, and either 150 or 151.

261. The United States in the Nineteenth Century

History of the United States from 1815 to 1900. 3 hours. Credit is not given for both HIST 261, and either 151 or 150.

262. The United States in the Twentieth Century

One major emphasis on foreign policy, including the emergence of the United States as a great power after 1898; a second emphasis on the Progressive movement and recurrent attempts at the reform of American society; and racial and urban problems and the conservation of natural resources included. 3 hours. Credit is not given for both HIST 262, and either 152 or 153.

263. Chicago, the City; Illinois, the State

History of Chicago and Illinois from prehistoric times to the present, illustrating the jarring conflicts and great achievements of peoples from all over the world. Politics, economics, popular and high culture, education, mass media, racial problems, and ethnic diversity are especially featured. There is an emphasis on the relation of city, state, and region to one another. 3 hours.

266. War, Military Institutions, and Society in South Asia from the Vedic Period to 1971

Discusses military institutions and styles of warfare on the South Asian subcontinent from the earliest recorded history to the independence of Bangladesh. Emphasizes the relationship between culture, society, and warfare. Views the subject from a South Asian as opposed to a British Imperial perspective. 3 hours.

267. History of Korea

Same as EALC 267. See EALC 267.

268. Religious Rebellions and Messianic Movements in History

Same as RELST 268. Comparative study of revolutionary religious movements from ancient times to the present. 3 hours.

269. Spirituality and Experience in the Arts of the Middle Ages

Same as ARTHI and RELST 269. See ARTHI 269. (Counts for advanced hours in L.A.S.)

271. African-American Women's History

Same as AFRO and W S 271. Examines the history of African American women, beginning with the West African background during the transatlantic slave trading era, emphasizing the experiences of black women in the United States during slavery and their political, civic, community and reform activities from slavery to the present, analyzed within the context of racism, sexism, and economic deprivation. African women in the diaspora, and the impact of feminism/womanism, Afrocentrism, and multicultural diversity on the African American woman are considered. 3 hours.

272. Women, Men, and Gender in American Society to 1877

Same as W S 272. Traces the experiences of North American women and men from the earliest encounters between Europeans and

Native Americans; examines gender systems in the colonies, under slavery, during industrialization and westward expansion; assesses impact of the Civil War and Reconstruction on gender roles; considers gendered division of labor in factories and domestic environments and construction of gender ideologies. 3 hours.

273. Women, Men, and Gender in American Society since 1877

Same as W S 273. Examines the experiences of women and men in modern America, focusing on variations according to class, race, ethnicity, religion, region, and sexual preference; considers the impact of social movements on gender politics; gender and the wars of the 20th century; gender, reform, and social welfare policy; and the place of popular culture in the production of gender ideologies. 3 hours.

274. United States and World Crisis, 1917 to Present

History of American foreign relations since World War I. 3 hours.

281. War, Military Institutions, and Society to 1815

Land and naval warfare from prehistory to Napoleon; discusses traditional topics such as technology, tactics, and strategy at length and demonstrates how military institutions are integrated with society as a whole. 3 hours.

282. War, Military Institutions, and Society since 1815

Land and naval warfare since Napoleon; technology, tactics, strategy, administration, and military institutions in themselves and as they relate to Western and non-Western societies; and conventional nuclear warfare. 3 hours.

285. Premodern Japanese History

Same as EALC 285. Introduction to the history of the Japanese people, their social and cultural systems, politics, and economy, from the earliest times to the sixteenth century. 3 hours.

286. Modern Japanese History

Same as EALC 286. Introduction to the history of the Japanese people, their social and cultural systems, politics, and economy, from the mid-sixteenth century to the mid-twentieth century. 3 hours.

290. Individual Study

Readings in selected fields in consultation with the instructor. *Prerequisite:* Junior or senior of high standing; written consent of the honors adviser. 3 hours. May be repeated to a maximum of 6 hours. Each 3-hour class must be taken with a different instructor. (Counts for advanced hours in L.A.S.)

292. Historiography and Methodology: A Pro-Seminar for Honor Students

Introduction to historiography and research methods preparatory to senior honors work in history. *Prerequisite:* A grade-point average of 3.5 or higher; junior standing; two semesters honors work in history or equivalent. Sophomores must obtain consent of depart-

ment. 3 hours. (Counts for advanced hours in L A S.)

293. Honors Senior Thesis

Two-semester research project. *Prerequisite:* History major with senior standing and 3.5 grade-point average; written consent of supervising professor and honors adviser. HIST 292 is required before HIST 293 may be undertaken. May be taken by honors students in partial fulfillment of department honors requirement. 3 hours. Must be repeated for a total of 6 hours. (Counts for advanced hours in L A S.)

295. Honors Colloquium

Topics will vary. *Prerequisite:* Chancellor's Scholar or consent of department and director of Campus Honors Program. 3 hours. (Counts for advanced hours in L A S.)

296. Special Topics

Topics are given on an experimental one-time-only basis. 3 hours. (Counts for advanced hours in L A S.)

298. Undergraduate Research and Writing Seminar

Prerequisite: Junior standing; 14 hours in history, or, with consent of instructor, 14 hours in the social sciences and/or humanities. 3 hours. (Counts for advanced hours in L A S.)

300. History of Early Judaism

Same as RELST 342. See RELST 342.

301. European Working Class History: 1750 to the Present

Same as L I R and SOC 301. Comparative study of the rise of the working class in European countries; formation, culture, and daily life; stratification within the working class; workers in organized labor and revolutionary movements. *Prerequisite:* One year of college history, or consent of instructor. 3 hours, or ½ or 1 unit.

302. Egypt Since the First World War

Same as AFRST 302. Examines the twentieth-century history of Egypt, emphasizing the internal social, political, economic, and ideological developments, with attention to Egypt's role in regional and international politics. Readings include novels and short stories to introduce students to modern Egyptian culture. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

303. Women in Muslim Societies

Same as ANTH, RELST, and W S 303. See RELST 303.

304. Medieval Civilization

Same as RELST 304. The architectural, artistic, philosophical, political, and religious components of medieval culture, thought, and patterns of behavior; includes monasticism and society and the individual. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours, or ½ or 1 unit.

305. The Age of the Renaissance

Same as RELST 305. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

306. The Age of the Protestant and Catholic Reformation, 1500–1648

Same as RELST 306. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

308. History of Western European Education: Antiquity to the Early Modern Era

Same as E P S 311. See E P S 311.

309. Development of Modern Europe; Absolutism and Colonial Expansion, 1648–1789

Prerequisite: One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

310. Europe in the Age of the French Revolution and Napoleon

Comparative survey of Western countries in the age of democratic upheavals; America, England, and Prussia as well as France; the rise of Napoleon and the response of Europe; and the fate of innovation and reform in the immediate aftermath of the Napoleonic Wars. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

311. European History from 1815 to 1871

Synthesis of politics, economics, and culture; revolutions, reaction, liberalism, conservatism, socialism, nationalism, romanticism, and realism. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

312. European History from 1871 to 1918

Synthesis of politics, economics, and culture; new state systems, long depression, imperialism, racism, nationalism, symbolism, *fin de siècle*, socialism, and World War I. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

313. European History from 1918 to 1939

Survey of European society from 1918 to 1939, with emphasis on the impact of World War I, the Russian Revolution, fascism, and the intellectual trends of the twenties and thirties. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

314. European History from 1939 to the Present

Survey of European society since 1939, with emphasis on the impact of World War II, the cold war, the establishment of the welfare state, and social developments. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

315. History of Western European Education: Early Modern Era to the Twentieth Century

Same as E P S 312. See E P S 312.

316. The Industrial Revolution in Europe, 1780–1900

Comparative analytic study of industrial development in England, France, Germany, and Russia; social, cultural, and demographic consequences of rapid economic change. 3 hours, or ½ or 1 unit.

318. European International Affairs, 1815–1914

The history of European international affairs from the Vienna Congress to the First World War, with the main focus on political developments, but with considerable attention also paid to the influence of domestic politics and social and economic changes on foreign policy. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

319. European International Affairs, 1914 to the Present

History of European international affairs from the First World War to the present day, concentrating on political developments, especially the two world wars, but including the impact of domestic politics, ideological struggle, and socio-economic change upon foreign policy. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

320. Russia from the Earliest Times to Peter the Great

Political, economic, cultural, and social development of Russia during the Kievan and Muscovite periods. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

322. The Emergence of the Modern Middle East in the Eighteenth and Nineteenth Centuries

Political, socio-economic and ideological developments in Egypt, Arabia, the Fertile Crescent, Iran and Turkey in the eighteenth and nineteenth centuries up to World War I: premodern society and institutions; European influence; self-strengthening reforms; and new religious, social and political movements. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

323. The Middle East in the Twentieth Century

Political and ideological developments in Egypt, Arabia, the Fertile Crescent (including Israel), Iran, and Turkey from World War I to the present, with emphasis on the period to the 1960s; economic, social, and cultural trends in the region also addressed. *Prerequisite:* One year of college history or political science, or consent of instructor. HIST 173 is recommended. 3 hours, or ½ or 1 unit.

324. Europe in the World Since 1750

Colonial encounter between Europe and today's Third World viewed in comparative historical perspective. Equal emphasis placed on (colonizing) Europe, and colonial experience of Asia, Africa, and South America. *Prerequisite:* One year college level history. 3 hours or 1 unit.

325. Southern Africa: Race and Power

Interdisciplinary survey of both the internal and international dimensions of the changing situation in Africa south of the Zambezi; focuses on the historical background to, and a political, economic, and social analysis of current events in the Republic of South Africa, Mozambique, Namibia, and Zimbabwe, emphasizing the central significance of race and power in this region. *Prerequisite:* HIST 216 or AFRST 222. 3 hours or 1 unit.

327. Russia from Peter the Great to the Revolution

Culture, society, and politics in Imperial Russia, focusing on power and resistance, the lives and culture of ordinary Russians, and competing ideas about the state, the individual, community, nation, religion, and morality. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit. For higher credit, graduate students will be required to do more reading and to write an additional paper.

328. History of the Soviet Union since 1917

Political, social, and economic development of the USSR since the 1917 revolutions that brought the Bolsheviks to power; social change and social engineering; political struggles among Stalin and his rivals; the "Stalin revolution" from above and economic modernization; the USSR's emergence through World War II and the Cold War as a world power; "developed socialist" society. *Prerequisite:* One year of college history, or consent of instructor. 3 hours, or ½ or 1 unit. Graduate students will write an additional substantial paper and engage in special discussion sections.

329. Southeastern Europe, 1700-1918

The political, economic, and cultural development of the Rumanians, South Slavs, Greeks, and Albanians; the impact of Ottoman rule; the rise of nationalism and the formation of national states; and the Orthodox Church. *Prerequisite:* One year of college history or consent of instructor. 3 hours or 1 unit.

330. Eastern Europe, 1919 to the Present

The political, economic, and cultural history of Poland, Czechoslovakia, Hungary, Rumania, Yugoslavia, Bulgaria, Greece, and Albania; particular emphasis upon the post-World War II era. *Prerequisite:* One year of college history or consent of instructor. 3 hours or 1 unit.

332. Medieval England

Economic, intellectual, religious, and social developments as reflected in the art and architecture of medieval England from the time of the German invasions to about the fifteenth century. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours, or ½ or 1 unit.

333. England under the Tudors and Stuarts, 1485-1660

Politics, religion, and society in the era of the Protestant Reformation and the Civil War. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

336. France, 1815-1920

The development of France, with special attention to questions of social history. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

337. American Working Class History, 1780 to the Present

Same as L I R 337. Focuses on working class formation, culture, ideas, and organization; examines daily experience of work and community life; special emphasis on race, ethnicity,

and gender in the process of class formation; labor relations and the changing patterns of working class protest and accommodation. *Prerequisite:* One year of college level history, or consent of instructor. 3 hours, or ½ or 1 unit.

338. History of Biology

Same as BIOL 338. Development of biological thought from antiquity to the present, emphasizing evolutionary theory and physiology in the nineteenth century and genetics in the twentieth century. *Prerequisite:* One year of college biology or history, or consent of instructor. 3 hours, or ½ or 1 unit.

339. Scientific Thought, I

Same as PHIL 317. See PHIL 317.

340. Scientific Thought, II

Same as PHIL 318. See PHIL 318.

341. Modern Britain: the Victorian Era, 1815-1900

History of the political, constitutional, social, economic, and diplomatic developments of the United Kingdom, including Ireland. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

342. Modern Britain Since 1900

History of the political, constitutional, social, economic, and diplomatic developments of the United Kingdom, including Ireland. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

344. The Ottoman Empire, 1566-1924

Economy, society, law, and government; the Ottomans and Mediterranean society; Ottoman culture and Islamic tradition; minorities; trade, diplomacy, and capitulations; "decline" and dismemberment; and traditional and Westernizing attempts at revival. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

345. History of Jews in the Diaspora

Same as RELST 345. Deals with the history of the Jewish people from the destruction of the Jewish state by Rome to the reestablishment of a Jewish state in 1948. The emphasis is on the interaction between the Jewish and non-Jewish worlds as well as changes internal to the Jewish communities. 3 hours or 1 unit.

346. Thought and Society in Modern Europe, 1789-Present

Same as SOC 304. Examines the reciprocal relationship between thought and society in western Europe from the French Renaissance to the present. *Prerequisite:* SOC 200, or one year of college history; or consent of instructor. 3 hours or 1 unit.

347. History of Roman Law and Legal Tradition

Examines Roman law and legal tradition in the context of historical, political, and social developments; origins of law in primitive and ancient classical societies; surveys development of precedent, codification, and preservation of Roman law, and the impact of Roman law on Western legal traditions. *Prerequisite:* One year of college history, political science, or classical civilization; or consent of instructor. 3 hours, or ½ or 1 unit.

349. War and Society in Early Modern Europe, 1450-1815

Technology, tactics, operations, and strategy of warfare from the Renaissance through the Napoleonic Era; the impact of war and military institutions upon economics, society, and government; topics vary. *Prerequisite:* HIST 281, 282, 306, 309, or 310, or consent of instructor. 3 hours or 1 unit.

350. Crises of Political Tolerance

Investigates the character of American political tolerance and freedom in times of crisis, through a series of case studies: images of the American "enemy"; the Red Scare after World War I; the internment of Japanese-Americans in World War II; McCarthyism; and the resentments generated by protest movements in the late 1960s. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

351. War on the Home Front in 20th Century America

Explores the domestic ramifications of war in modern America through a comparison of the U.S. home front experience in the "total" wars of World War I and World War II and "limited" wars in Korea, Vietnam, and the Persian Gulf. *Prerequisite:* One year of college history. 3 hours, ½ or 1 unit.

352. Colonial Beginnings of American Life and Institutions

Study of the seventeenth- and eighteenth-century colonies to 1763. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

353. Development of Plantation Societies in the Americas

Same as AFRO 353. See AFRO 353.

354. The Era of the American Revolution, 1763-89

Prerequisite: One year of college history. 3 hours, or ½ or 1 unit.

355. Federalists, Jeffersonians, and the Era of Good Feeling

United States history from 1789 to 1828, with emphasis on the conflict between nationalism and sectional interests. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

357. History of American Families

Same as HDFS 357. Overview of family life in the United States from colonial times to the present. History of childhood and adolescence, dating and courtship, sex and reproduction, husband-wife relations, female-headed households, and aging. Major transformations in family structure and authority patterns, and consequences of those transformations. *Prerequisite:* One year of college history. 3 hours or 1 unit.

359. Civil War and Reconstruction

The United States between 1850 and 1877, with emphasis on the causes of the war, wartime problems of the North and South, and efforts to create a new Union after the war. 3 hours, or ½ or 1 unit.

360. Landscapes and Texts: Comparative Approaches to Environmental History

Same as ENVST 360. Focuses on the methodological and conceptual debates in the field of environmental history. Comparative examples drawn from the U.S., Latin America, and Africa will be used to explore descriptions of historical landscapes, the differential impact of global capitalism on those landscapes, and to critique the varieties of scholarly approaches deployed. The central questions are: Do we create histories from texts or from the landscapes we observe? How can we test scholarly claims about causality and the direction of change over time? *Prerequisite:* HIST 160. In addition, either (a) a 100 or 200 level course in American history; and a 100 or 200 level course in either Latin American or African history; or (b) a 200 level course in ENVST. 3 hours, or ½ or 1 unit.

361. Immigrant America

History of immigration and immigrant groups in the United States from 1830 to 1980. Covers major waves of immigration and focuses on the diverse cultural heritage, social structure, and political activism of immigrants from Europe, the Americas, and Asia. *Prerequisite:* One year of college American history or consent of instructor. 3 hours or 1 unit.

362. History of the United States since 1932

Discusses the New Deal, the Cold War, Franklin D. Roosevelt and subsequent presidents, the structure of American imperialism, and America's role in world politics. *Prerequisite:* One year of college history, political science, or economics. 3 hours, or ½ or 1 unit.

363. Social History of Industrial America to 1918

The impact of industrialization, immigration, and urbanization on American society to the end of World War I. *Prerequisite:* One year of college history. 3 hours, or ½ or 1 unit.

364. Social History of Industrial America Since World War I

Study of the impact of industrial technology, business enterprise, immigration, and urbanization on American society. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

365. American Public Health and Health Policy

American public health and health policy since the late-nineteenth century. Emergence of modern public-health institutions in America; relation of public health to conceptions of disease, social order, and the role of government; emergence and development of public policy issues in public health and medical care, of the environment for the formulation of policy, and the relation of policy to broader issues of social development, incidence of disease, and assumptions about the proper distribution of public and private responsibility. *Prerequisite:* One year of college history or consent of instructor. 3 hours or 1 unit.

367. History of the American West: A Legacy of Conquest and Resistance

Same as LLS 367. Examines the changing image of the American West by focusing on the

process of conquest and resistance present within the region's history. *Prerequisite:* One semester of U.S. history or consent of instructor. 3 hours or 1 unit.

368. The South in American History

Same as AFRO 368. Exploration of the history of the American South identifying and explaining differences between the South and the rest of the nation; examines the correlates of economic change in the realms of politics, social structure, and cultural values. Race relations provides a central theme of the course. 3 hours, or ½ or 1 unit.

370. Four Latin American Ideas:

Structuralism, Dependency, Liberation Theology, Pedagogy of the Oppressed

Same as LAT ST 376. Examines Latin American schools of thought widely influential in the Third World. Considers propositions of each set of ideas, historical development of each, relations among the schools, critiques, and transformations. *Prerequisite:* One year of history or social science. 3 hours, or ½ or 1 unit.

371. American Intellectual and Cultural History to 1865

Same as RELST 381. Examines the role of religious, scientific, political, social, educational, and artistic thought and institutions in shaping a distinctive American culture, emphasizing Puritanism, the Enlightenment, and the Romantic movement. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

372. American Intellectual and Cultural History since 1859

Same as RELST 382. Treats the leading intellectual and cultural influences in shaping modern and contemporary America, emphasizing the impact of Darwinism and naturalistic thought, science and technology, the American university, divisions in religious thought (Modernism, Fundamentalism, Neo-Orthodoxy), the Counterculture, and the New Conservatism. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

373. History of American Foreign Relations to 1917

3 hours, or ½ or 1 unit.

375. Andean Countries of South America, 1532 to the Present

The history of Colombia, Ecuador, Peru, Bolivia, and Chile; emphasizes common problems and diverse responses, from the conquest in the sixteenth century to the struggles for development in the twentieth. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

376. Classical Chinese Thought

Same as EALC 376. See EALC 376.

377. History of Modern Brazil, 1808 to the Present

Problems of a neocolonial society; themes include family structure, slavery, imperialism, modernization, and the crisis of traditional institutions. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

378. History of Mexico, 1519 to the Present
Development of Mexico from the conquest to the postrevolutionary present. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

379. Slavery and Race Relations in Latin America

Same as AFRO 379. Selected topics on Indians and Spaniards, whites and blacks, emphasizing Mexico, the Caribbean, and Brazil. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

380. Twentieth Century Africa: The Colonial Era

The peoples, cultures, and societies of Africa under European colonial dominance. Although attention is paid to colonial policies and practices, the primary focus is on the continuing autonomy of African peoples. Special attention will be given to the cases of Ethiopia and South Africa. *Prerequisite:* HIST 215, 216, or AFRST 222, or junior standing. 3 hours or 1 unit.

381. Ancient Greek States

History of the Greek states from the earliest times to 334 B.C. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

382. Alexander and His Successors

Prerequisite: One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

383. History of the Roman Republic to 44 BC

Prerequisite: One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

384. The Roman Empire

Prerequisite: One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

385. African Independence and Underdevelopment: 1945 to the Present

Same as POL S 332. Historical investigation of African political economies based on selected case studies; includes development of the colonial economy, economic bases of African nationalism, and postindependence underdevelopment and attempts to escape from it. *Prerequisite:* One year of college history or enrollment in the AFRST program. 3 hours, or ½ or 1 unit.

386. The Horn of Africa: Nationalism and Revolution

Complete survey of the history of the Horn, from the origins of agriculture and pastoralism to the late twentieth century. Covers classical Aksum, medieval Ethiopia, and the coastal Islamic city states; concentrates on the twentieth century and the rise of conflicting nationalisms, the outbreak of revolution, and famine. *Prerequisite:* HIST 216 or AFRST 222 or junior standing. 3 hours or 1 unit.

387. History of Central America

Major themes of Central American history since conquest: the Colonial regime, ethnic diversity, the independence movement, fragmentation in the nineteenth century, export economies and imperialism, 1880-1932, social movements and populism in the twentieth century, revolution and intervention

since the 1950s. *Prerequisite:* One year of college history or consent of the instructor. 3 hours, or ½ or 1 unit.

388. India from Colony to Nation
Mughal Empire and British Raj, Indian national awakening, and struggle for independence under Ghandi and Nehru. 3 hours, or ½ or 1 unit.

390. China Under the Ch'ing Dynasty
Same as EALC 390. The period of Manchu domination in China (1644-1912); emphasis on Chinese reactions to Western influences during the nineteenth century. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

391. Early Modern Japan: The Making of National Culture
Same as EALC 391. Study of the people, culture, and society from 1600 to 1868. Traces the rise of Japan's first truly national culture. *Prerequisite:* One course in Japanese history: EALC 150, HIST 170, 285, or 286, graduate standing, or consent of instructor. 3 hours or 1 unit.

392. Twentieth-Century Japan: Negotiating Modernity
Same as EALC 392. Study of the people, culture, and society of Japan from 1868 to the present. Traces Japan's transformation from an insular bastion of "centralized feudalism" into a cross-cultural crucible of post-industrial democracy. *Prerequisite:* One course in Japanese history: EALC 150, HIST 170, 285, or 286, graduate standing, or consent of instructor. 3 hours or 1 unit.

393. Social-Economic History of Modern China
Same as EALC 393. Disintegration of traditional social and economic systems during the nineteenth and twentieth centuries, and the political effects of that disintegration; examines changes in the agricultural economy, changing rural elites, urbanization, and emergence of new social classes. It is recommended that students take HIST 390 and 394 before registration in HIST 393. 3 hours, or ½ or 1 unit.

394. Twentieth-Century China
Same as EALC 394. Chinese state and society in revolutionary transition; emphasis on the Nationalist and Communist revolutions and their results. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

396. Politics and Society in Twentieth-Century Germany
Political upheavals of twentieth-century Germany; topics include the First World War's impact on German society, the war's revolutionary aftermath, the political struggles and cultural achievements of the Weimar Republic, the rise of Hitler, the Third Reich, the Holocaust, the Second World War, and the divided postwar Germanies; novels and films complement readings. *Prerequisite:* HIST 112. 3 hours or 1 unit.

397. History of Spain and Portugal
Iberian history from pre-Roman times to the present with emphasis on the modern period. *Prerequisite:* One year of college history or consent of instructor. 3 hours, or ½ or 1 unit.

410. Core Seminar in Science, Technology, Information, and Medicine Studies
Same as SOC 410. See SOC 410.

411. Seminar in Ancient History: Greece
1 unit.

413. Seminar in Ancient History: Rome
1 unit.

415. Seminar in Medieval History
1 unit.

417. Seminar in European History, 1350-1648
1 unit.

421. Seminar in European History Since 1789
1 unit.

423. Seminar in English History to 1688
1 unit.

425. Seminar in English and British Empire History Since 1688
1 unit.

427. Seminar in Russian History
1 unit.

434. Research Seminar in Japanese History
Same as EALC 434. Period covered will alternate between the Early Modern (1550-1850) and Modern (1850-present) eras. *Prerequisite:* Graduate standing in HIST, EALC, or other related discipline and reading knowledge of Japanese, or consent of instructor. 1 unit. May be repeated as topics vary to a maximum of 2 units.

441. Seminar in Near and Middle Eastern History
Investigates research topics in Near and Middle Eastern history in accordance with students' needs. Topics may vary from semester to semester. Students will prepare oral and written reports. *Prerequisite:* Graduate standing. 1 unit. May be repeated to a maximum of 2 units.

448. Seminar in African History
Prerequisite: HIST 215, 216, and one upper-level African history course. 1 unit.

451. Seminar in Early American History to 1789
1 unit.

453. Seminar in American History Since 1789
1 unit.

461. Seminar in Latin American History
1 unit.

468. Colonialism and Culture
Same as ANTH 468. See ANTH 468.

471. Seminar in the History of Science
1 unit.

472. Seminar in History of Medicine: Selected Topics from Antiquity to the Present
1 unit.

473. Seminar in Military History
Prerequisite: Consent of instructor. 1 unit.

474. Problems in Japanese History
Same as EALC 474. Period covered will alternate between the Early Modern (1550-1850) and Modern (1850-present) eras. *Prerequisite:* Graduate standing. 1 unit. May be repeated to a maximum of 2 units.

475. Problems in Ancient History
1 unit.

476. Problems in Medieval History
1 unit.

477. Problems in Early Modern European History
1 unit.

478. Problems in European History Since 1789
1 unit.

479. Problems in English History Before 1688
1 unit.

480. Problems in English History Since 1688
1 unit.

481. Problems in Russian History
1 unit.

482. Problems in Military History
Prerequisite: Graduate standing. 1 unit.

483. Problems in Chinese History
Same as EALC 483. 1 unit.

484. Problems in European History, 1350-1648
1 unit.

485. Problems in Near and Middle Eastern History
Covers, in depth, major problems of specific periods and areas and the relevant literature of Near and Middle Eastern History, which will vary from semester to semester. *Prerequisite:* Graduate standing. 1 unit. May be repeated as topics vary to a maximum of 2 units.

486. Problems in American History to 1830
1 unit.

487. Problems in American History Since 1815
1 unit.

488. Problems in Latin American History
1 unit.

489. Problems in African History
1 unit.

490. History and Social Theory
Introduces recent historical work drawing upon theories and concepts from the social sciences; considers fields of inquiry which include family history, demographic history, la-

bor history, prosopographical and entrepreneurial studies, local and regional studies, and others. 1 unit.

491. Quantitative Techniques for Historians

Focuses on the use of quantitative techniques in historical research, exploring problems in research design, data management and computer techniques, and the evaluation of statistics used by historians. *Prerequisite:* SOC 385 or consent of instructor. 1 unit.

492. Problems in Comparative History

Intensive comparative examinations of particular issues in the histories of multiple countries, cultures or periods; emphasizes methodology, the discipline of comparative history, and the nature of historiography in a cross-cultural and interdisciplinary context. 1 unit.

495. Individual Research Project

Directed research in special fields; may be taken in lieu of seminars in fields in which seminars are seldom offered. 1 unit.

496. History of Historiography

Introduction to the great historians from early times to the present. *Prerequisite:* Graduate standing in history or consent of instructor. 1 unit.

497. Reading Course

Directed readings in special fields. Primarily, but not exclusively, for students with a master's degree or equivalent, who are preparing for the preliminary examination in history and who need instruction in areas not provided by current course offerings. *Prerequisite:* Consent of instructor. 0 to 1 unit.

498. Problems in the Teaching of College History

Prerequisite: Candidate for Ph.D. degree in history. ½ unit.

499. Thesis Research

Individual direction in research and guidance in writing theses for advanced degrees. 0 to 4 units.

HISTORY OF ART

(See Art and Design, School of)

HUMAN AND COMMUNITY DEVELOPMENT

Head of Department: Constance H. Shapiro
Department Office: 274 Bevier Hall, 905 South Goodwin Avenue, Urbana
Phone: 333-3790
URL: www.aces.uiuc.edu/~hcd

Including Agricultural Communications (AGCOM), Agricultural Education (AG ED), Human and Community Development (HCD), Human Development and Family Studies (HDFS), and Rural Sociology (R SOC)

Agricultural Communications (AGCOM)

111. Introduction to Agricultural and Environmental Communications

Introduction to the uses of mass communications media and theories in agricultural and environmental communications and community and human development, and to professional opportunities in applied communications in agricultural, environmental, and human services organizations. 3 hours.

114. Writing for Agricultural and Environmental Media

Same as JOURN 114. Introduction to writing for the agricultural and environmental media. Emphasis on basic skills used to communicate through these media, with particular emphasis on writing skills. *Prerequisite:* Completion of campus Composition I requirement; sophomore standing. 3 hours.

190. Student Publications and Media

Reporting, photography, editing and other production for Illini Horizons and other College of Agricultural, Consumer and Environmental Sciences student publications and broadcast activities. *Prerequisite:* Consent of instructor; open to students in good standing. 1 to 3 hours. Course may be repeated in separate semesters to a maximum of 12 hours. Students may register in this course more than once in the same term for a total of 3 hours. Approved for S/U grading.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

214. Educational Campaign Planning

Same as JOURN 214. Coordinated approach to planning and carrying out information campaigns using a variety of communications media; students contact and work with an agency interested in running a communications campaign, plan an information strategy, and produce a variety of information materials related to the campaign topic. *Prerequisite:* Completion of the campus Composition I general education requirement. 4 hours.

240. Photography in Agriculture

Application of visual communications principles to agriculture using the photograph as medium; emphasizes communicative, creative, and technical aspects. See *Timetable* for approximate cost of materials. 4 hours.

250. Communications Internship

Supervised learning experience with cooperating communications business, organization, or agency. Students arrange internship opportunity and coordinate award of credit with faculty member. *Prerequisite:* Written consent of instructor or departmental approval prior to advance enrollment and registration; not open to students on probation. 1 to 4 hours. Course may be repeated in separate semesters to a maximum of 8 hours. Students may repeat enrollment in the course with approval of supervising faculty member. Approved for S/U grading.

270. Agricultural Sales Communications

Role, dynamics, and principles of personal sales communications as related to food and agriculture; methods for analyzing, setting objectives, planning, conducting and evaluating sales communications efforts; individual observation of principles applied by agricultural sales professionals. *Prerequisite:* Junior standing; enrollment preference to students in the College of Agricultural, Consumer and Environmental Sciences. 3 hours.

273. Presenting Environmental Information

Same as ENVST and NRES 273. Examines four types of information necessary for promoting social change: problem analysis, benefit and risk, utility, and mobilization information. Students apply principles of information analysis and presentation using desk-top publishing software. *Prerequisite:* Completion of the campus Composition I general education requirement. 3 hours.

275. Environmental Communications

Same as ENVST and NRES 275. Basics of communicating about environmental issues to various audiences, emphasizing communication to lay publics. Gathering information about a current environmental issue, analyzing interests of groups involved, and examining strategies for communicating clearly to different groups. *Prerequisite:* Completion of the campus Composition I general education requirement. 3 hours.

280. Leadership Development

Examines leadership theory, styles and roles of leaders; includes exercises and activities to improve functional leadership skill, as adapted to career interests of the individual class member. *Prerequisite:* RHET 105 and SPCOM 101; or equivalent. 3 hours.

290. Professional Seminar

Professional developments and issues in agricultural communications; the agricultural communicator today; and avenues for continuing professional growth. *Prerequisite:* Junior-senior standing in agricultural communications. 1 hour.

300. Special Problems in Agricultural Communications

Special projects, readings, research, or other studies on topics in agricultural communications. *Prerequisite:* Written consent of instructor or departmental approval prior to advance enrollment and registration; not open to students on probation. 1 to 4 hours, or ¼ to 1 units. May be repeated to a maximum of 8 hours or 2 units.

348. Communication in Environmental Social Movements

Same as ENVST and SOC 345, and NRES 358. Examines the interests, values systems and communications strategies of key participants in the environmental movement. Students examine environmental issues and predict possible reactions from key participants in the environmental arena. *Prerequisite:* SOC 100 or R SOC 110; completion of the campus Composition 1 general education requirement. 3 hours or ¾ unit.

410. Communication in International Development

Same as COMM 410. Competing theoretical approaches to communication in development; practical questions in promoting local agricultural, community and institutional development for individuals and target groups; national-level issues including cultural imperialism and new world information order. *Prerequisite:* Graduate credit in SOC/R SOC 343 or consent of instructor. 1 unit.

460. Teaching of College-Level Agriculture
Analysis and preparation for the problems encountered in the effective teaching of college-level agriculture and home economics; systems approach, including instructional objectives, preassessment of students, instructional strategies, materials, and student performance evaluation; and detailed study of individual problems supplements class work. *Prerequisite:* Master's standing. ½ unit.

Agricultural Education (AG ED)**120. Agricultural Education Programs and Principles**

Introduction to agricultural education programs and delivery systems; state and federal policies; the nature of teaching in school and nonschool settings; types and purposes of agricultural education; program components; approaches to teaching; teacher characteristics; community relationships; educational change and innovation; trends and developments in agricultural education; and reflective teaching. 3 hours.

150. Observation and Program Analysis in Agricultural Education

Early field experience in agricultural education, including observation and analysis activities in public schools, extension programs, or other selected settings; participation in clinical field experience activities; examination of educational program development and operation, teaching and learning processes, contextual factors in learning, evaluation of student learning; and professionalism. Approximately 45 hours of early field experience will be ac-

quired. Off-campus observation begins the first week of January. Agricultural education programs in both school and nonschool settings are examined. *Prerequisite:* AG ED 120. 1 hour.

200. Special Projects

Independent study on topics pertaining to agricultural education. *Prerequisite:* Junior standing in agricultural education or consent of instructor. 1 to 3 hours. May be repeated in subsequent semesters to a maximum of 3 hours.

280. Pre-Internship in Agricultural Education

Supervised experience during the late spring and summer months; conducting summer program activities; supervising students' agricultural experience programs and projects; identifying community characteristics; becoming acquainted with internship programs, facilities, and personnel; gathering other information needed to successfully complete the internship experience. Approximately 60 hours of early field experience must be completed. *Prerequisite:* AG ED 150 and concurrent registration in AG ED 310. 1 hour.

285. Delivery and Evaluation of Agricultural Education Programs

Students complete this course during their twelve-week internship experience (either AG ED 290 for noncertification students or ED PR 242 for certification students). Written assignments will focus on development of teaching plans, program initiation and improvement plans, and actual evaluation studies of Agricultural Education programs. Instruction will be provided during on-site faculty visits and by cooperating personnel. *Prerequisite:* AG ED 310 and concurrent registration in AG ED 290 or ED PR 242. 4 hours.

290. Internship in Agricultural Education

Supervised educational experience in extension, agribusiness, community, or other settings for a twelve-week period; includes experience in planning and conducting programs, individual and group teaching, managing facilities and equipment, supervising field experiences of students, counseling students, advising youth organizations, evaluating teaching and learning, and determining program effectiveness. Restricted to Agricultural Education majors. *Prerequisite:* AG ED 310 and concurrent registration in AG ED 315 and 285. 8 hours. Students may not receive credit for AG ED 290 and ED PR 242, Section AE.

310. Methods of Teaching Agriculture

Review of principles of teaching and learning as they influence teaching activities; psychological aspects of learning; using problem-solving teaching; teaching methods; course planning and development; developing teaching plans; laboratory teaching; evaluating student learning; maintaining discipline; motivating students; and examining personal teacher behaviors that influence learning. *Prerequisite:* EDPSY 211, or equivalent or consent of instructor. 3 hours or ¾ unit.

315. Agricultural Education Seminar

Analysis of teaching and learning processes, program evaluation and improvement strategies, curriculum development and modification, professional development, facility development, using community resources, program management, and discussion of trends and issues in agricultural education. Meets last five weeks of semester. *Prerequisite:* Senior standing and concurrent registration in AG ED 290 or ED PR 242. 1 hour or ¼ unit.

320. Youth Development Programs

Instruction in the youth development process, including learning; philosophy and purposes of youth development policies, programs, and organizations; relationships to organizational missions; principles and procedures for developing, coordinating, and implementing youth development programs; and examining research and practice in youth-at-risk initiatives. *Prerequisite:* AG ED 120, or HDFS 105, or PSYCH 100 or a equivalent social science course. 3 or 4 hours, or ¾ or 1 unit.

400. Special Topics in Agricultural Education

Advanced study in selected phases of agricultural education applicable to agricultural educators in schools, community colleges, universities, cooperative extension, agribusiness, and community and governmental agencies. *Prerequisite:* Consent of instructor. ½ to 1 unit.

475. Laboratory Teaching Methods

Theoretical and practical approaches to teaching agriculture in laboratory settings; mechanics, horticulture, agriscience, land laboratories, and other school-based and community-based laboratories will be considered. Research and theoretical foundations that underlie the aspects of planning, management, teaching, evaluation, safety, finance, and facility design will be discussed within the context of laboratory instruction in agriculture. *Prerequisite:* AG ED 310 or equivalent with a graduate course in educational psychology recommended. 1 unit.

Human and Community Development (HCD)**417. Community Studies Theory**

Same as SOC and U P 417. Covers main currents of thought and paradigms in community studies and developments. Focuses on theories of community definition and functioning, building and sustaining community, and the impact of societal change on community processes. *Prerequisite:* Graduate standing in HCD or consent of instructor. 1 unit.

422. Contemporary Topics in Community and Rural Studies

Provides an in-depth examination of contemporary issues and emerging research topics in the fields of community studies and rural studies. Major emphasis is placed on examining various theoretical perspectives, evaluating research designs and writing for academic markets. *Prerequisite:* Graduate standing in HCD or a related area of study, and consent of instructor; courses in statistics and community or rural studies. 1 unit.

449. Independent Study

Individual investigation and reporting of research on any phase of agricultural education selected by the student and approved by the adviser and faculty member who will supervise the study. $\frac{1}{2}$ to 1 unit. May be repeated to a maximum of 2 units.

493. Advanced Studies in Human and Community Development

Library or experimental research on specific problems of limited scope. May be taken in addition to 8 units required for a master's degree by students who do not write a thesis. For nonthesis students only. $\frac{1}{2}$ or 1 unit. May be repeated to a maximum of 1 unit.

495. Seminar in Human and Community Development

Discussion and evaluation of current literature on selected topics in human and community development. *Prerequisite:* Graduate standing in HCD or consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated.

498. Special Problems in Human and Community Development

Research or independent study on a special problem that is not part of thesis work. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ to 2 units. May be repeated in the same or separate semesters to a maximum of 2 units.

499. Thesis Research

Individual thesis research under supervision of faculty in specialized fields of human and community development. 0 to 4 units. May be repeated.

Human Development and Family Studies (HDFS)**105. Introduction to Human Development**

Systematic overview of the psychological, biological, familial, and cultural factors related to human growth and development across the life span. 3 hours.

106. Observation and Assessment of Human Development

Introduction to the study of human development through systematic observations. Includes an introduction to both qualitative and quantitative observational techniques. *Prerequisite:* HDFS 105, or consent of instructor. 4 hours.

110. Introduction to Family Studies

Overview of current concepts, theories, and substantive issues in family studies from an interdisciplinary perspective. Gives attention to variation in family form and function across different social/cultural contexts and how family experience is structured by gender. Examines issues of family development (marriage, parenting, divorce, remarriage, aging family) and explores the links between families and other social institutions. 3 hours.

143. Biological Bases of Human Behavior

Same as ANTH 143. See ANTH 143.

145. Introduction to Women's Studies in the Social Sciences

Same as SOC 145 and W S 112. See W S 112.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

202. Development of Curriculum for Infants and Preschoolers

Introduces development of curriculum for children from birth to age five; integrates child development theory and principles with programming for young children in preschool and childcare settings. *Prerequisite:* HDFS 105, or consent of instructor. 4 hours.

203. Infancy and Early Development

Reviews development during the first five years of life, including cognitive, social, and biological aspects of early development; lab involves first-hand observation of young children to supplement and extend lecture material. *Prerequisite:* HDFS 105 or PSYCH 216, or consent of instructor. 4 hours.

205. Children and Families With Special Needs

Through case studies of community programs, lectures, and guest speakers (e.g., teenage mothers), students are exposed to what life is actually like for women and children whose lives do not fit the stereotypes of the American family. Course objectives are to identify these women and children with special needs, to become aware of the impact of situational factors such as migrant life, poverty, and violence on women and children, and to begin to develop ideas about prevention and intervention. 3 hours.

210. Comparative Family Organization

Same as ANTH 210. Cross-cultural examination of the family in relation to its environment, the family as an environment, and the family structure as it changes over time; evaluates findings in anthropology, sociology, and psychology; examines current issues in American family life. 3 hours.

214. Introduction to Aging

Same as CHLTH, LEIST, PSYCH, and REHAB 214. A multidisciplinary introduction to the study of aging; the social, psychological and physiological context of changing roles in later life; public and private policies that affect older people and their families. *Prerequisite:* HDFS 105, or 3 hours of social science. 3 hours.

215. Courtship and Marriage

Development of cross-sex and same-sex relationships that lead to marriage or intimate living over the life cycle; the dissolution of such relationships; emphasizes the effects of social and cultural environments on intimate relationships. *Prerequisite:* Sophomore standing or above. 3 hours. Students may not receive credit for both HDFS 215 and SOC 321.

225. Middle Childhood

Systematic overview of the normative changes that occur in the physical, cognitive, social, emotional, and moral domains during the middle childhood period as well as current social issues that confront many of today's children (such as school violence or poverty). *Prerequisite:* HDFS 105. 3 hours.

262. Motor Development, Growth, and Form

Same as KINES 262. See KINES 262.

290. Supervised Research Experience

Supervised participation in research and scholarly activities in human development and family studies, usually as assistant to a faculty investigator. *Prerequisite:* Consent of academic adviser, written consent of instructor. 1 to 3 hours. Not open to students on probation. May be repeated in separate semesters to a maximum of 10 hours.

291. Thesis

Intended primarily for candidates for honors but open to other seniors. *Prerequisite:* Senior standing; approval of head of department. 3 to 5 hours.

292. Thesis

Intended primarily for candidates for honors but open to other seniors. *Prerequisite:* Senior standing; approval of head of department. 3 to 5 hours.

301. Issues in Socialization and Development

Presents and uses theories of socialization to evaluate and analyze current issues and socialization practices; delineates historical and philosophical trends in socialization, and discusses the implications of these trends for generating social policy affecting the developing individual. *Prerequisite:* HDFS 202 and 203 or equivalent. 4 hours or 1 unit.

302. Sex Roles

Same as SOC and W S 302. Examines social institutions that affect sex differences in power and prestige, especially market labor, household labor, and fertility; social, emotional, and cognitive developmental differences over the life span. *Prerequisite:* SOC 100 or HDFS 105; or 6 hours of anthropology, geography, political science, or sociology. 3 hours or 1 unit.

303. Hospitalized Children and Their Families

Examines the developmental needs of children in hospitals and their families; delineates the role of the Child Life Specialist and familiarizes students with hospital procedures and personnel. Clinical placement includes direct experience with hospitalized children and their families. *Prerequisite:* HDFS 202, 205, and 319, and consent of instructor. 3 or 4 hours, or 1 unit.

304. Gerontology

Same as REHAB 304. Interdisciplinary approach to the study of aging and the aged from developmental, behavioral, and social perspectives. *Prerequisite:* Senior standing. 3 hours or 1 unit.

305. Pediatrics and Nutrition

Same as C & I 324 and FSHN 305. See FSHN 305.

310. Contemporary American Family

Examination of the variety of forms families assume in the United States; families are compared in the areas of kinship, family organization, patterns of interpersonal relationships, socialization, values, and integration with the larger society. *Prerequisite:* HDFS 210 or consent of instructor, and 6 hours of social science. 3 hours, or $\frac{3}{4}$ or 1 unit.

314. Race and Ethnic Issues in Family Sociology and Education

Same as AFRO, E P S and SOC 314. See E P S 314.

316. Adolescent Development

Examines paths of experience and individual development within the family, the peer group, and other domains through this socially-defined stage of life. *Prerequisite:* Six hours of Human Development and Family Studies courses, or equivalent social science courses. 3 hours, or $\frac{3}{4}$ or 1 unit.

319. Professionalism and Supervision in Child Development Settings

Examines the relationships between child development theories and developmentally appropriate and individualized instruction techniques, discipline and guidance strategies, and the role of the family in child development programs. Emphasizes program supervision. Includes direct experience with children and families in a laboratory setting. *Prerequisite:* HDFS 202, 203 and 210, junior standing and consent of instructor. 5 hours or $1\frac{1}{4}$ units.

320. Organization and Administration of Child Development Programs

Designed to provide a set of learning activities and experiences that will allow students to study in-depth the issues surrounding the development, implementation, and evaluation of intervention programs for children from economically disadvantaged and high-risk backgrounds. Emphasis is placed on the synthesis and application of knowledge gained in prior courses to develop potential solutions to societal problems facing children. *Prerequisite:* Senior standing and minimum of four HDFS courses, or consent of instructor. 3 hours or 1 unit.

330. The Family in International Settings

Examines the impact of technological change on the family in developing nations, compared with the Western world; includes coverage of the effects of various development approaches and projects on family roles, form, and resource access, and the effects of family characteristics on the success of development projects. *Prerequisite:* HDFS 210, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

335. Latina/Latino Families and Children in the United States

Same as LLS 335. Course explores a variety of topics and provides a basic overview of issues relevant to the understanding of Latina/Latino families and children in the United States. The class examines recent demographic changes in the U.S. population and its implications for the socialization and education of Latina/Latino children and their families. Course content looks at such areas as who are Latina/Latino families; how are those families different from others; what are the similarities and differences within Latinas/Latinos; how does acculturation and language fit into our understanding of these families; and what are the implications for the education success of current and future Latina/Latino children. *Prerequisite:* HDFS 105 or equivalent. 3 hours or 1 unit.

349. Music in Early Childhood

Same as MUSIC 349. See MUSIC 349.

350. Practicum in Human Development and Family Studies

Supervised on- or off-campus learning experience related to human development or family studies, supervised in cooperation with an appropriate agency or institution. *Prerequisite:* Human Development and Family Studies major; junior standing. Not available to students on probation. 3 to 12 hours, or 1 to 3 units. Not available to students on probation. (Only 1 unit of the course may be applied to the total required for a graduate degree in Human Resources and Community Development. At the undergraduate level, only 4 hours may be applied to the total HDFS courses required.)

354. Growth and Physical Development of Children

Same as KINES 354. See KINES 354.

357. History of American Families

Same as HIST 357. See HIST 357.

370. Family Conflict Management

Examines processes of conflict management in family and community disputes; emphasizes negotiation and mediation as modes of dispute settlement. *Prerequisite:* HDFS 210 or 310, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

388. Special Topics in Human Development and Family Studies

Prerequisite: Senior standing and consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

390. Human Development: Theory and Methodology

Discussion and evaluation of theories of human development and critical examination of current research; examples from current literature illustrating research methods and the differing theoretical orientations shaping research directions in human development. 4 hours or 1 unit.

410. Family Interaction

Observation and qualitative analysis of the family as a system; how family organization emerges, is maintained, and changes through social interaction. *Prerequisite:* HDFS 390 or equivalent. 1 unit.

418. Seminar in Human Development

Overview of theories and research in human development; focuses on major issues regarding development, differing conceptualizations of those issues, and relevant research. *Prerequisite:* Consent of instructor. 1 unit.

419. Seminar in Family Research and Theory

Presents an advanced, multidisciplinary approach to current theories and research in the areas of marriage and the family. *Prerequisite:* HDFS 310, or consent of instructor. 1 unit.

420. Contemporary Topics in Human Development

In-depth analysis of a current issue in human development with special emphasis on general methodological problems illustrated through examples from one area of research.

Prerequisite: Second-year graduate standing in Human Development and Family Studies or a related area, and consent of instructor; courses in statistics research methods. 1 unit.

421. Contemporary Topics in Family Studies

In-depth analysis of a current issue in family studies with special emphasis on general methodological problems illustrated through examples from one area of research. *Prerequisite:* Second-year graduate standing in Human Development and Family Studies or a related area, and consent of instructor; courses in statistics and HDFS 390 or equivalent. 1 unit.

Rural Sociology (R SOC)

110. Introduction to Rural Society

Basic concepts for understanding and analyzing rural society; topics include changes in major rural institutions, impacts of technological change on rural people and communities, demographic patterns and trends, migration, rural minorities and subcultures, the city-countryside relationship, emerging controversies and conflicts in rural areas, and cross-cultural comparisons of rural life. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

270. Population Issues

Same as SOC 270. See SOC 270.

343. Social Change in Developing Areas

Same as SOC 343. Description and analysis of recent social and cultural changes occurring in new nations and developing economies; special attention given to problems of traditional social structure undergoing modernization; and social factors in economic growth, caste and class, nation-building, urbanization and population composition, education, family, and religion. *Prerequisite:* SOC 100 or equivalent. 3 hours, or $\frac{1}{2}$ or 1 unit.

344. Social Impact Assessment

Same as ENVST, L A, LEIST, NRES, and U P 344. See LEIST 344.

347. Environmental Sociology

Same as ENVST and SOC 347. See SOC 347.

440. Public Involvement in Resource

Management and Environmental Planning
Same as ENVST, L A, LEIST, NRES, and U P 440. See NRES 440.

HUMAN RESOURCE EDUCATION

Head of Department: Tim L. Wentling
Department Office: 345 Education Building,
1310 South Sixth Street, Champaign
Phone: 333-0807
URL: hre.ed.uiuc.edu

Human Resource Education (HRE)

152. Pre-Educational Internship

Early field experiences in an educational setting, including observation and laboratory experiences in community colleges, adult vocational programs, business and industry, health service settings, or governmental agencies; provides opportunities for career exploration, professional orientation, interrelating theory and practice, and understanding the place of the student in the educational process. *Prerequisite:* Consent of instructor. 0 to 3 hours.

189. Supervised Occupational Experience

Provides students preparing to teach in the vocational and technical fields the occupational experience necessary or appropriate to complete the requirements in these curricula. Students who are employed and concurrently enrolled in this course complete assignments covering the related technical information of their chosen fields and undergo regularly scheduled written, oral, and performance examinations. Application for a job assignment must be made three months prior to the semester in which placement is desired. *Prerequisite:* Sophomore standing. 2 or 3 hours. May be repeated to a maximum of 17 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

249. Independent Study

Permits study of problems not considered in other courses; designed for students who excel in self-direction and intellectual curiosity. *Prerequisite:* Upperclassman; upper five percent of class in grade-point average; demonstrated writing competence, research potential, scholarly attitude, and interest as attested to by instructors; consent of adviser and staff member who supervises the work. 2 hours.

252. Educational Internship

Practicum in a postsecondary educational setting to prepare students for educational roles where public school certification is not necessary or appropriate. *Prerequisite:* HRE 152 and satisfactory progress in the Technical Education Specialties curriculum. 5 to 8 hours.

291. Thesis

Prerequisite: Senior standing. 2 hours.

345. Transition Planning and Vocational Training for Individuals with Disabilities

Same as REHAB and SP ED 345. See SP ED 345.

349. Special Study and Investigation in Education and Training

Offers opportunity for an individual to study, on or off campus, selected problems, trends, and new developments or to conduct specialized technological investigations for the improvement of instructional programs in areas related to education and training. *Prerequisite:* Consent of instructor; demonstrated ability to pursue special study or investigation proposed. 2 or 4 hours, or ½ or 1 unit. May be repeated to a maximum of 8 hours or 2 units.

359. Professional Skill Development in Education and Training

Designed to teach practitioner-oriented skills in specialized areas of human resource education; students or faculty members may make requests for initiation of sections of this course. Topics vary; consult *Timetable* for specific section offerings. 2 or 4 hours, or ½ or 1 unit. May be repeated to a maximum of 8 hours or 2 units.

381. Foundations and Principles of Education for Work

Study of the basic concepts and practices of education for and about work: its philosophical foundations and historical development, mission and goals, structure and function, curricular areas of emphasis, learner audiences served (pre-secondary, secondary, post-secondary), and settings (school and non-school) in which programs are conducted, and issues and trends affecting program change. 4 hours or 1 unit.

383. Instructional Design for Business and Technical Settings

Provides instruction and practice in the selection, organization, and preparation of content for instructional programs in business and technical settings. Provides students with a theoretical orientation to instructional design as well as the opportunity to experience the instructional design process as it applies to business and technical settings through the development of instructional materials. *Prerequisite:* Foundation course in vocational, technical, or HRD or consent of instructor. 4 hours or 1 unit.

384. Instructional Technologies for Education and Training

Same as C & I 384. Covers a wide range of instructional technologies that are used for instructional and administrative purposes. Although traditional instructional media such as overhead projectors, slide projectors, film projectors and VCRs are considered in the course, emphasis is on computer applications in instructional technology. Through course readings, discussions, and projects, students gain skills in choosing appropriate instructional technologies, designing effective presentations, and effectively using instructional technologies to enhance communication with an audience. *Prerequisite:* HRE 383 or equivalent course in instructional design. 4 hours or 1 unit.

385. Supervised Internship in Education and Training

While employed in approved cooperating business firms, students observe the relationship between their work activities and specialized educational programs in high school and community college. Emphasis is placed on job analysis, current trends, wage and benefit structure, personnel practices, labor relations, and their implications for teaching. *Prerequisite:* Completion of prescribed courses in human resource education for teaching in their area of specialization; consent of instructor. 4 hours or 1 unit.

387. Training Programs in Business and Industry

Study of the status of education, training and development within business and industry; includes an overview of the systemic process for planning, delivery, and evaluation of training programs; and explores major problems, trends, and issues associated with the field. 4 hours or 1 unit.

388. Instructional Techniques for Business and Technical Settings

Provides a research-based exploration of effective teaching techniques for instructors of business, industry, and community college technical programs. Equips students with a conceptual framework for instruction and provides guidance and experience in the planning, delivery and evaluation of instruction. 4 hours or 1 unit.

389. Business Principles for Human Resource Development Professionals

Study of essential business understandings, knowledge, and skills required for HRD professionals to interact effectively with others in the business community. *Prerequisite:* HRE 387 or consent of instructor. 4 hours or 1 unit.

390. Project Management in Education and Training

Study of the basic principles and techniques related to managing personnel, time and resources in education and training projects. Through group and individual activities, including case study review and project simulation, students will apply project management tools and techniques in international training and educational setting. *Prerequisite:* HRE 389 or consent of instructor. 4 hours or 1 unit.

399. Issues and Developments in Education and Training

Special course for experimentation or for seminar on topics not treated by regularly scheduled courses: requests for initiation of this course may be made by students or faculty members. Topics vary; consult *Timetable* for specific section offerings. 2 or 4 hours, or ½ or 1 unit. May be repeated to a maximum of 8 hours or 2 units.

442. The Community College

Same as EOL 442. See EOL 442.

445. Investment in Human Resources

Same as L I R 445. See L I R 445.

448. Continuing Education Program Development

Same as EOL 448 and C & I 402. See EOL 448.

449. Independent Study

Offers opportunity and challenge of self-directive, independent study, that is, develops the individual's ability as an independent student and enables the student to pursue needed study in a field in which appropriate courses are not being offered during a given semester. *Prerequisite:* Approval of study outline by adviser and the department chairman prior to enrollment. ½ or 1 unit. May be repeated for credit with consent of adviser and department chair.

450. Evaluation of Education and Training Programs

Theory and techniques of evaluation in cognitive, affective, and psychomotor domains at different educational levels and settings; development and analysis of activities and instruments for students and program evaluation, follow-up studies, and interpretation of results for self-evaluation and for administrative decision making. *Prerequisite:* HRE 453, or consent of instructor. 1 unit.

452. Diversity in Education and Training

Assists educators, as well as trainers and managers in business and industry, to effectively recognize and understand diversity in school and work settings. Activities focus on understanding the nature of diverse populations, their unique learning needs, and potential collaborative efforts between educators and work place personnel. *Prerequisite:* Consent of instructor. 1 unit.

453. Disciplined Inquiry in Education and Training

Provides an analysis and synthesis of disciplined inquiry in post-secondary education and private-sector training including an historical perspective, formulation of the research process, and the utilization and communication of research. *Prerequisite:* EDPSY 390 or equivalent, or consent of instructor. 1 unit.

454. Strategic Planning for Human Resource Development

Study of the essential components, research and knowledge base, purposes, contributions and limitations in the planning of Human Resource Development programs in a wide variety of organizational settings. *Prerequisite:* HRE 387 or consent of instructor. 4 hours or 1 unit.

456. Problems and Trends in Specialized Fields of Education and Training

Introduction to significant problems, points of view, and trends in the field concerned; explores significant research relating to organization, content, and techniques in the field in question. Topics vary; consult *Timetable* for specific section offerings. Students are encouraged to make special studies in approved areas. 1 unit. May be repeated for credit with consent of adviser and department chair.

457. International Human Resource Development in Developing Countries

Designed to provide insights into human resource development at the macro level. Readings represent various regions of the world. Consulting perspective is used to analyze approaches used by international donor agencies (World Bank, ILO, UNDP, and USAID) to implement national HRD programs. Case studies from countries in Europe, Asia, and Africa are discussed to illustrate the impact of economic, social and cultural influences on HRD policies and programs. *Prerequisite:* One HRD course or consent of instructor. 1 unit.

471. Policy and Program Development in the Community College

Local, state, and national policies for community college education; organizing for policy making and program development; and de-

veloping desirable policies and programs. 1 unit.

482. Designing Research Studies in Education and Training

Study and evaluation of examples of research designs in education and training; consideration of the research needed to solve present problems. Each student proposes and completes a brief research project or plans in detail a major research project to be completed later. *Prerequisite:* HRE 453 or equivalent; or consent of instructor. 1 unit.

484. Technology Transfer

Examines the processes involved in transferring technologies from one organization or culture to another. Special emphasis is placed on the change process and its relationship to the diffusion of technology. Concludes with the identification of strategies that can be used to facilitate successful technology transfer. Students are required to complete extensive readings on the relevant topics, participate in discussions, and examine case studies related to technology transfer. 1 unit.

485. The Nature of Expertise and Its Development

Covers developments in cognitive-based research as they relate to the design and implementation of technical instruction. Through readings, discussions, and projects, students gain an understanding of how people learn complex information, how skills are developed, and how instructors can better guide their students toward the development of expertise. *Prerequisite:* Basic course in psychology of learning or consent of instructor. 1 unit.

486. Management of Training and Development

Study of management fundamentals related to planning, organizing, staffing, leading, and controlling the training function in organizations. *Prerequisite:* HRE 387 or consent of instructor. 4 hours or 1 unit.

487. Applying Quality Processes in Educational Leadership

Same as EOL 487. Examines quality management processes, (i.e., process management, quality improvement, total quality management (TQM), team problem solving) and considers their implications for educational leadership in a broad spectrum of public secondary and postsecondary systems, and private sector educational organizations. Considers the roles and responsibilities of educators as team leaders, problem solvers, innovators, and organizational change agents in processes designed to improve education. *Prerequisite:* HRE 489 or EOL 463, or consent of instructor. 4 hours or 1 unit.

488. Foundations of Curriculum Development in Education and Training

Synthesizes selected sociological, psychological, and epistemological foundations for curriculum development in education and training; application of theories from fundamental disciplines to practice in existing and emerging curricula involving perceptual and psychomotor learning. 1 unit.

490. Seminar for Advanced Students of Education

Seminar in vocational and technical education open only to persons who have been admitted for doctoral study in vocational and technical education; sections are usually offered in the following areas: (a) industrial education, (b) agricultural education, (c) home economics education, (d) business education, and (e) general vocational and technical education. 0 to 2 units.

491. Field Study and Thesis Seminar

Assists doctoral candidates in planning field studies and thesis problems; students present their studies at each of four stages: (1) the inception, delimitation, tentative design stage; (2) the proposed design stage; (3) the revised design stage; and (4) the final design stage. Students are expected to analyze critically all presentations. *Prerequisite:* Limited to students who have been admitted for doctoral study. 1 to 2 units.

499. Thesis Research

Individual direction of research and thesis writing. 0 to 4 units.

HUMAN DEVELOPMENT AND FAMILY SYSTEMS

(See Human and Community Development)

HUMANITIES

Program Coordinator: Brian L. Rainer
Office: 270 Lincoln Hall, 702 South Wright Street, Urbana
Phone: 333-4714
URL: kingbird.las.uiuc.edu/las/p_HUMAN.html

Humanities (HUMAN)

141. Introduction to American Civilization, I
 Introduction to the multidisciplinary study of major aspects, events, and periods of the American experience; includes a series of topics, each focusing on one society, movement, or historical event as reflected in literature, art, history, and politics. 3 hours.

142. Introduction to American Civilization, II
 Continuation of HUMAN 141. 3 hours.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars. *Prerequisite:* Consent of

departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

271. Introduction to Second Language Education

Same as FR, GER, LAT, RUSS, and SPAN 271. See SPAN 271.

290. Individual Study

Supervised reading and research on interdisciplinary humanities topics chosen by the student in consultation with a faculty member. *Prerequisite:* Consent of humanities adviser (an approved Learning Agreement must be submitted to 270 Lincoln Hall, 702 S. Wright Street, Urbana, not later than the second week of the semester or the first week of the summer session). 2 to 4 hours. May be repeated to a maximum of 8 hours.

292. Senior Thesis

Individual research for majors in humanities leading to the completion of a thesis. *Prerequisite:* Senior standing, a declared option in humanities major, and consent of adviser. 2 to 4 hours. May be repeated to a maximum of 8 hours. (Counts for advanced hours in L.A.S.)

295. Special Topics: Interdisciplinary

Interdisciplinary topics in the humanities; topics vary, but are normally related to one of the options in the humanities major. 3 hours. May be repeated as topics vary; students may register for two different topics in the same semester.

297. Special Topics: Junior Seminar and Tutorial

Interdisciplinary seminar and tutorial in selected topics related to one of the options in the humanities major. *Prerequisite:* Junior standing and consent of humanities adviser (tutorial students must submit an approved Learning Agreement to 270 Lincoln Hall, 702 S. Wright Street, Urbana, not later than the second week of the semester or the first week of the summer session). 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

298. Special Topics: Senior Seminar and Tutorial

Interdisciplinary seminar and tutorial in selected topics related to one of the options in the humanities major. *Prerequisite:* Senior standing and consent of humanities adviser (tutorial students must submit an approved Learning Agreement to 270 Lincoln Hall, 702 S. Wright Street, Urbana, not later than the second week of the semester or the first week of the summer session). 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E1 L, FR, GER, ITAL, PORT, SLAV, and SPAN 382, and LING 386. Theory and practice of computer-assisted instruction, with special emphasis on problems and techniques of foreign-language instruction. General principles; survey of existent and prob-

able future CAI systems; and practical experience with lesson design and programming on the IBM and Macintosh personal computers. Linguistics majors are advised to complete LING 306 before registering for this course. *Prerequisite:* Two years college language or equivalent, and consent of instructor. 4 hours or 1 unit.

388. French and Comparative Cinema, I

Same as C LIT, CINE, and FR 388. See FR 388.

389. French and Comparative Cinema, II

Same as C LIT, CINE, and FR 389. See FR 389.

395. Special Advanced Topics:

Interdisciplinary

Offers interdisciplinary topics in the humanities; topics vary, but normally relate to the interdisciplinary areas of study within the humanities major or to the special humanities facilities (e.g., the Language Learning Laboratory). *Prerequisite:* Prerequisites will vary according to topic. See *Timetable*. 3 hours or 1 unit. May be repeated as topics vary to a maximum of 6 hours or 2 units.



INDUSTRIAL DESIGN

(See Art and Design, School of)



INDUSTRIAL ENGINEERING

(See Mechanical and Industrial Engineering)



INTEGRATIVE BIOLOGY

School Office: 286 Morrill Hall, 505 South Goodwin, Urbana
Phone: 333-3044

Integrative Biology (IB)

150. Organismal and Evolutionary Biology
Introduction to function, genetics, and evolution of organisms, and their ecology and diversity. 4 hours. Students may not receive credit for this course and BIOL 120, 121, or 122.

151. Organismal and Evolutionary Biology Laboratory

Topics follow lecture topics in IB 150 and include labs in ecology, plant and animal function and genetics and evolution. Designed for nonmajors needing a year of biology with lab. *Prerequisite:* Credit or concurrent registration in IB 150. 1 hour. Students may not receive credit for this course and BIOL 120, 121, or 122. Credit for IB 151 cannot be counted for Integrative Biology or Molecular and Cellular Biology majors.

201. Genetics and Evolution

Principles of Mendelian genetics, origins of genetic variation, natural selection, and evolution. The laboratory emphasizes genetics, biodiversity, plant and animal phylogeny, and evolution. *Prerequisite:* IB 150 and MCB 150. 4 hours. Students may not receive credit for this course and BIOL 120.

202. Structure and Function

How organisms function in acquiring, processing, and allocating resources in the face of environmental constraints. The laboratory emphasizes the variation among organisms in their form and function. *Prerequisite:* IB 150 and MCB 150. 4 hours. Students may not receive credit for this course and BIOL 120 and 121.

203. Ecology

The links between evolution and ecology, population dynamics, community structure and function, and ecosystem function on local and global scales. Basic ecology needed to understand environmental problems and to conserve biodiversity. Investigations in both field and laboratory included. *Prerequisite:* IB 150 and MCB 150; or BIOL 121. 4 hours.



ITALIAN

(See Spanish, Italian, and Portuguese)



JAPANESE

(See East Asian Languages and Cultures)

JOURNALISM

Head of Department: Ronald E. Yates
 Department Office: 120A Gregory Hall, 810
 South Wright Street, Urbana
 Phone: 333-7931
 URL: <http://www.comm.uiuc.edu/spike/>

Journalism (JOURN)

114. Agricultural Communications Media and Methods

Same as AGCOM 114. See AGCOM 114.

150. Introduction to Journalism

Discussion of the history, freedom, technologies, ethics, and functions of the news media. Training in clear, descriptive writing techniques, using journalistic models. Counts toward campus Composition II general education requirement. *Prerequisite:* Completion of campus Composition I general education requirement. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

214. Educational Campaign Planning

Same as AGCOM 214. See AGCOM 214.

217. History of Communications

Same as COMM 217. See COMM 217.

218. Communications and Public Opinion

Same as COMM 218. Theory of public opinion and of communications; relation of communication systems to public opinion, social systems, and the political order. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

220. Communications and Popular Culture

Same as COMM 220. See COMM 220.

223. Photojournalism

Basic photography course designed to give students a proficiency in picture taking and processing and to acquaint them with picture editing and other illustrative problems. For current fees, see *Timetable*; cameras provided by the college. *Prerequisite:* Registration in the College of Communications or consent of instructor. 3 hours.

231. Mass Communication in a Democratic Society

Same as COMM 231. See COMM 231.

241. Law and Communications

Same as COMM 241. Historical background of the nature and meaning of the law as it relates to journalism and contemporary problems of freedom of expression. *Prerequisite:* Registration in the College of Communications or consent of the college. 3 hours.

251. Social Aspects of Mass Communications

Same as COMM and SOC 251. See COMM 251.

291. Special Problems

Special projects, research, and independent reading in journalism for students capable of individual work under the guidance of a faculty adviser. *Prerequisite:* Consent of head of department. 1 to 3 hours.

293. Journalism Seminar

Seminar based on summer internship experience; offered only in the fall for students who participated in a spring pre-internship orientation class and then completed an approved summer internship. *Prerequisite:* JOURN 350; open only to undergraduate journalism majors who have taken a noncredit internship orientation. 0 to 2 hours.

322. The Press and the Presidency in the Modern Era

Traces historical development of press commentary about the President, press conferences, news flow from Washington, radio and television coverage of the White House, the White House press corps and more since the Hoover Administration. Reporters' personal relationships with chief executives and the influence of news organizations upon national policy and issues will be covered. 3 hours, or 1 or ½ unit.

326. Magazine Article Writing

Preparation of feature stories and articles; techniques of marketing, market analysis, and publishing articles written in the course. *Prerequisite:* JOURN 350; registration in the College of Communications or consent of the college. 3 hours or ½ unit.

330. Magazine Editing

Basic principles of editing for consumer, business, trade, and company magazines; communications theory, market analysis, editorial process, design process, production process, and distribution process as they relate to magazine publishing. *Prerequisite:* Credit or concurrent registration in JOURN 326 or consent of instructor. 3 hours or ½ unit.

350. Reporting, I

Fundamentals of journalistic writing; reporting news of public affairs. *Prerequisite:* Registration as a major in the Department of Journalism or consent of department, and JOURN 150. 4 hours or 1 unit.

360. Graphic Arts

Rational and aesthetic standards of visual communications; principles and techniques of making visual statements; and uses of visual technology in wedding verbal and nonverbal languages. For current fees, see *Timetable*. *Prerequisite:* Registration as a major in the Department of Journalism or consent of department. 4 hours or 1 unit.

362. Broadcast News Production

Introduces radio and TV news production designed to acquaint students with techniques, principles, and equipment used in the studio and in the field; emphasizes planning, producing, and directing individual news and public affairs programs and news stories, and serving on production teams. For current fees, see *Timetable*. *Prerequisite:* Registration as a major in the Department of Journalism or consent of department. 4 hours or 1 unit.

370. News Editing

Newspaper editing and headline writing; the makeup and design of newspaper pages. *Prerequisite:* JOURN 350 and 360; registration as a major in the Department of Journalism or consent of department. 4 hours or 1 unit.

372. Broadcast News Writing and Gathering

Gathering, writing, and editing news for radio and television; critical analysis of broadcast news practices, past and present; ethics of broadcast journalism; audio and visual communication principles as applied to news dissemination; editing and writing to film, tape and graphics. Individual and team projects. *Prerequisite:* JOURN 350 and 362; registration as a major in the Department of Journalism or consent of department. 4 hours or 1 unit.

380. Reporting, II

The interviewing, analytical, and writing techniques of reporting complex news stories with clarity and depth. *Prerequisite:* JOURN 350 and 360; registration as a major in the Department of Journalism or consent of department. 4 hours or 1 unit.

382. Broadcast News Editing

Principles of editing audio tape, video tape, and scripts with audio-visual materials; editing story units for broadcast; assembling news and public affairs programs; broadcast news editing ethics, research, and criticism. *Prerequisite:* JOURN 372; registration as a major in the Department of Journalism or consent of department. 4 hours or 1 unit.

390. Advanced Reporting

Advanced reporting projects in specialized fields; recommended for news-editorial seniors. *Prerequisite:* JOURN 350 and 380. 3 hours or 1 unit.

392. Broadcast Journalism Practicum

Individual and team-produced advanced enterprise projects in specialized fields. Subject matter to be coordinated with JOURN 390. *Prerequisite:* JOURN 382; registration as a major in the Department of Journalism or consent of department. 3 hours or 1 unit.

400. Issues in Journalism

Seminar on issues of contemporary importance in journalism. *Prerequisite:* Consent of department. ½ unit.

468. The Political Economy of Communications

Same as COMM 468. See COMM 468.

470. Communications and Popular Culture

Same as COMM 470. See COMM 470.

471. Proseminar in Communications, I

Same as COMM 471. See COMM 471.

472. Proseminar in Communications, II

Same as COMM 472. See COMM 472.

473. History and Theory of Freedom of the Press

Same as COMM 473. See COMM 473.

474. Communications Systems

Same as COMM 474. See COMM 474.

480. Journalism Masters' Proseminar

Introduction to scholarship and research in journalism and mass communication examining theoretical approaches to the meanings, uses, and effects of mass media in society; discussion of media freedom and accountability; humanistic and social scientific contributions to understanding mass communication. *Prerequisite:* Graduate standing in journalism or consent of instructor. 1 unit.

490. Special Topics in Journalism

Prerequisite: Consent of head of department. ½ or 1 unit.

492. Research Methods in Communications
Same as COMM 492. See COMM 492.**499. Thesis Research**

Prerequisite: Graduate standing in journalism. 1 to 2 units.

KINESIOLOGY

Interim Head of Department: Robert L. Sprague
Department Office: 117 Freer Hall, 906 South Goodwin Avenue, Urbana
Phone: 244-0823
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Kinesiology (KINES)

100. Developmental Activities

Skills and knowledge essential for leisure-time activities which are classified as developmental activities. *Prerequisites for each developmental activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. 1 to 2 hours.

Section A: Conditioning and Weight Control
Activities and understanding which contribute to the development and/or maintenance of physical fitness and a well-proportioned body. 1 to 2 hours. May be repeated once for credit if taken in successive semesters; credit not to exceed a total of 2 hours.

Section B: Personal Defense

Skills and understanding essential for defense against an aggressor, with emphasis on avoiding attack. 1 hour.

Section C: Weight Training

Skills and knowledge essential for use of weights for conditioning the body. 1 hour. May be repeated once for credit if taken in successive semesters.

Section D: Physical Fitness

Activities and understanding which contribute to the development and maintenance of physical fitness according to social and hygienic standards. 1 hour. May be repeated once for credit if taken in successive semesters.

Section H: Hatha Yoga

Introduction to Hatha Yoga, which is concerned with the physical well-being of the entire organism; includes a graduated program of postures (asanas), stretching movements, and muscular relaxation and breathing exercises. 1 hour.

Section I: Outdoor Adventures

Introductory skills and knowledge for development of life time activities in basic backpacking, basic river canoeing, and mountaineering techniques (balance climbing and rappelling). Includes participation in one field trip during the semester. For current fees, see *Timetable*. *Prerequisite:* KINES 106A and 107A; or consent of instructor. 1 hour.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. 1 hour.

101. Dance Activities

Skills and knowledge essential for leisure-time activities which are classified as dance activities. *Prerequisites for each dance activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. 1 hour.

Section A: Ballroom Dance, I

Introductory skills and understanding essential for ballroom dance, with emphasis on fox-trot, rhumba, lindy, waltz, cha-cha, and selected fad dances. 1 hour.

Section B: Ballroom Dance, II

Intermediate skills and understanding essential for ballroom dance, with emphasis on fox-trot, rhumba, lindy, waltz, and cha-cha as well as tango, samba, and paso doble. *Prerequisite:* KINES 101A or consent of instructor. 1 hour.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. 1 hour.

102. Individual and Dual Activities

Skills and knowledge essential for leisure-time activities which are classified as individual and dual activities. *Prerequisites for each individual or dual activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. 1 hour.

Section A: Tennis, I

Introductory skills, knowledge, and conditioning essential for court play. 1 hour.

Section B: Tennis, II

Intermediate skills, knowledge, and attitudes for effective court play. *Prerequisite:* KINES 102A or consent of instructor. 1 hour.

Section C: Golf, I

Introductory skills and understanding essential for course play, with emphasis on irons. For current fees, see *Timetable*. 1 hour.

Section D: Golf, II

Intermediate skills and understanding essential for use of irons and woods; analysis of course play. For current fees, see *Timetable*. *Prerequisite:* KINES 102C or consent of instructor. 1 hour.

Section E: Bowling, I

Introductory skills and understanding essential for bowling. For current fees, see *Timetable*. 1 hour.

Section F: Bowling, II

Intermediate skills and understanding essential for bowling. For current fees, see *Timetable*. *Prerequisite:* KINES 102E or consent of instructor. 1 hour.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. 1 hour.

103. Indoor Court Activities

Skills and knowledge essential for leisure-time activities which are classified as indoor court activities. *Prerequisites for each indoor court activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. 1 hour.

Section A: Racquetball, I

Introductory skills, knowledge, and strategies essential for racquetball. 1 hour.

Section C: Badminton

Introductory skills, knowledge, and conditioning essential for badminton. 1 hour.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. 1 hour.

104. Skating Activities

Skills and knowledge essential for leisure-time activities which are classified as skating activities. *Prerequisites for each skating activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. 1 hour.

Section A: Figure Skating, I

Introductory skills, knowledge, and conditioning essential for figure skating. For current fees, see *Timetable*. 1 hour.

Section B: Figure Skating, II

Intermediate skills, knowledge, and conditioning essential for figure skating, with emphasis on skills to pass the United States Figure Skating Association's preliminary tests. For current fees, see *Timetable*. 1 hour.

Section D: Ice Hockey

Introductory skills, knowledge, and conditioning essential for ice hockey. For current fees, see *Timetable*. 1 hour.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. 1 hour.

106. Swimming Activities

Skills and knowledge essential for leisure-time activities which are classified as swimming activities. *Prerequisites for each swimming activity are given below.* More than one activity (Sections A through Z) may be taken in the same term if these activities are offered on an 8-week basis. 1 hour.

Section A: Swimming, I

Introductory skills, knowledge, and conditioning essential for swimming. Open only to nonswimmers and those with no deep water experience. 1 hour. May be repeated once for credit.

Section B: Swimming, II

Intermediate skills, knowledge, and conditioning essential for swimming. Open only to swimmers who can execute a minimum of one of the five basic strokes in deep water, perform a standing dive, and tread in deep water. *Prerequisite:* KINES 106A or consent of instructor. 1 hour.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. 1 hour.

107. Aquatic Sport Activities

Skills and knowledge essential for leisure-time activities which are classified as aquatic sport activities. *Prerequisites for each aquatic sport activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. *1 hour.*

Section A: Canoeing

Introductory skills and knowledge essential for handling a canoe with safety. *Prerequisite:* KINES 106B or consent of instructor; the ability to jump or dive into deep water while clothed and maintain a survival position for 10 minutes. For current fees, see *Timetable*. *1 hour.*

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. *1 hour.*

109. Team Sport Activities

Skills and knowledge essential for leisure-time activities which are classified as team sport activities. *Prerequisites for each team sport activity are given below.* More than one activity (Sections A through Z) may be taken in the same term. *1 hour.*

Section A: Volleyball, I

Introductory skills, knowledge, and conditioning essential for power volleyball. *1 hour.*

Section B: Volleyball, II

Intermediate skills, knowledge, and conditioning essential for power volleyball. *Prerequisite:* KINES 109A or consent of instructor. *1 hour.*

Section C: Basketball

Introductory skills, knowledge, and conditioning essential for basketball. *1 hour.*

Section H: Soccer

Introductory skills, knowledge, and conditioning essential for soccer. *1 hour.*

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. *1 hour.*

110. Gymnastic Activities

Skills and knowledge essential for leisure-time activities which are classified as gymnastic activities. *Prerequisites for each gymnastic activity are given below.* More than one activity (Sections C through Z) may be taken in the same term. *1 hour.*

Section C: Tumbling

Introductory skills, knowledge, and conditioning for tumbling and free exercise. *1 hour.* May be repeated once for credit.

Section Z: Special Topics

Specific subject matter varies and is indicated in the *Timetable*. *Prerequisite:* Consent of instructor. *1 hour.*

111. Prescribed Exercise

Prescribed exercises adapted to individual needs, capacities, and interests; open to persons with paraplegia, permanently disabled, and individuals with significant temporary disabilities who will require long term rehabilitation. *1 hour.*

120. Injuries in Sport

Emphasizes injury mechanisms, means of injury prevention, and emergency care applied to various types of sport injuries; laboratory sessions emphasize preventive and

therapeutic taping and emergency first aid. *2 hours.*

121. Survey of Sports Medicine

Introduction to sports medicine for non-Kinesiology majors; includes discussion of training, conditioning, and preparation for sports, injury aspects of sports, and rehabilitation. *3 hours.*

122. Physical Activity, Physical Fitness and Health

Gives students the most current information for a basic understanding and appreciation of the contribution of physical activity, physical fitness and nutrition in the development and maintenance of a strong, healthy body throughout life. Designed primarily for non-Kinesiology majors. *3 hours.*

125. Introduction to Kinesiology

Course serves as an introduction to Kinesiology and will provide an overview of the Kinesiology curriculum, areas of study, and opportunities available for a career in the field. *0 hours.* Approved for S/U grading.

130. Fundamental Analysis and Performance of Basic Movement Skills

Introduction to human movement through development of skills and knowledge relative to structure and function of the human body in selected physical activities including: basic postural and locomotion patterns and fundamental throwing patterns; also studies developmental aspects of typical and atypical movement skills. Emphasizes performance and qualitative analysis of movement skills. *1 hour.*

131. Movement Skills: Fitness

Development of and participation in a physical fitness program including physical fitness assessment. *1 hour.*

132. Movement Skills: Swimming

Development of an understanding of basic swimming skills; emphasizes performance and qualitative analysis of personal aquatic skills, developmental aspects of aquatic skills, and analysis of atypical movement patterns in an aquatic environment. *Prerequisite:* KINES 130, and ability to execute a minimum of one of five basic strokes in deep water, perform a standing dive, and tread in deep water. *1 hour.*

133. Movement Skills: Dance

Development of an understanding of basic dance steps, positions and sequences; emphasizes performance and qualitative analysis of personal dance skills, developmental aspects of dance and rhythm, and analysis of atypical movement patterns in a dance setting. *Prerequisite:* KINES 130. *1 hour.*

134. Movement Skills: Gymnastics

Development of an understanding of basic gymnastic movements and sequences; emphasizes performance and qualitative analysis of personal gymnastic skills, developmental aspects of gymnastic skills, and analysis of atypical movement patterns in a gymnastic setting. *Prerequisite:* KINES 130. *1 hour.*

135. Movement Skills: Field Activities

Development of an understanding of basic field activity skills; emphasizes performance, as well as an appreciation of commonalities, in specific activities including soccer, speedball, speedaway, field hockey and flag football. *Prerequisite:* KINES 130. *1 hour.*

136. Movement Skills: Racquet Activities

Development of an understanding of basic racquet activity skills; emphasizes performance, as well as appreciation of commonalities in specific racquet activities such as tennis, badminton, squash or racquetball. *Prerequisite:* KINES 130. *1 hour.*

140. Social Scientific Bases of Sport

Introduction to the social scientific aspects of human movement including sport; particular emphasis on concepts derived from the social sciences (including psychology) that are appropriate to human movement. *3 hours.*

141. Sports in Greece and Rome

Same as CLCIV 150. See CLCIV 150.

142. Contemporary Issues in Sport

Examines current issues in sport relative to competition, economics, race, sex, youth, educational institutions, deviant behavior, religion, psychology, and the media. *3 hours.*

150. Bioscientific Foundations of Human Movement

Integrates anatomical and physiological aspects of human movement; emphasizes how the body moves, physiological responses to exercise stress, physical conditioning and physical fitness. *3 hours.*

167. Techniques of Teaching Aerobics

Development of knowledge and practical experience concerned with the teaching and evaluating of aerobic exercise classes. This course will cover teaching, cuing, and performance of stretching, strengthening, and aerobic activities used in exercise classes. Awareness of injuries, criteria for certifications, format styles, equipment usage, and consumer products will be studied. *Prerequisite:* KINES 101 (Section Z2), or skill equivalent. PHYS 103, CSB 234, and KINES 255 are recommended. *2 hours.*

168. Lifeguard Instructor Training and Aquatic Risk Management

Examines the development of aquatic risk management and advanced rescue techniques as well as a system of lifeguard selection and training. Intended primarily for skilled aquatic personnel with the common goal of creating and maintaining a safe aquatic environment. May lead to American Red Cross certification both Lifeguard Training and Lifeguard Instructor Training. *Prerequisite:* The ability to swim 500 yards continuously, swim 15 yards underwater, and recover a 10 lb. brick from a depth of 12 feet. *2 hours.*

169. Water Safety Instructor Training

Designed to prepare aquatic professionals to teach progressive levels of swimming. Students will also learn how to analyze human movement in the aquatic environment. May lead to American Red Cross certification both Lifeguard Training and Lifeguard Instructor

Training. *Prerequisite:* American Red Cross Level VI swimming ability and Emergency Water Safety knowledge and ability. 2 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

220. Fundamentals of Athletic Training
Discussion of the role of the athletic trainer; legalities, facilities, advanced emergency procedures, injury prevention and organization and administration of athletic health care programs. Understanding the process of injury and healing as a basis for prevention and treatment of athletic injuries is emphasized. Laboratory sessions stress special taping and emergency procedures, equipment, and individual techniques towards NATA Competencies. *Prerequisite:* CSB 234, KINES 120, or consent of instructor. 2 hours.

222. Bases for Prescription of Therapeutic Exercises
Functional anatomy and injury constraints as a basis for prescription of therapeutic exercises for musculoskeletal conditions; laboratory sessions stress clinical evaluation of muscle and joint function and familiarization with therapeutic exercises. *Prerequisite:* PHYSL 103 and CSB 234. 3 hours.

239. Coaching Strategies
Examination of philosophy, ethics, strategies, motivational techniques, performance analysis, program organization, contest administration, and equipment and facility management related to coaching. 3 hours.

240. Social and Psychological Aspects of Physical Activity
Discusses how social and psychological processes and constraints affect human action in physical activity environments. Attention is given to socialization, personal dynamics, stratification, and ideological and economic constraints upon the manifestations of physical activity. *Prerequisite:* KINES 140 or consent of instructor and completion of the Campus Composition I general education requirement. 3 hours.

244. Anthropology of Play
Same as ANTH 244. Overview of the general field, research and literature comprising the anthropological study of human play. Emphasis is on the study of definitions and critiques of human play from various cultural perspectives. Provides extensive practice in writing within the genre of cultural anthropology. *Prerequisite:* One course in Socio-Cultural Anthropology or consent of instructor and a Composition I course. 3 hours.

247. Introduction to Sport Psychology
Analysis of the competitive sport process, with study of how personality and situational variables affect motivation, anxiety, and aggression in sport. Attention is given to the psychological skills needed by coaches and athletes for successful and enjoyable sports participation. 3 hours.

249. Sport and Modern Society
Same as SOC 249. The sociological analysis of sport in modern societies with regard to social

class, politics, community, education, and collective behavior. 3 hours.

252. Bioenergetics of Human Movement
Study of the nature of energy transfer during physical activity; mechanisms of metabolic control, force production, cardiorespiratory support and adaptation relative to physical activity. Laboratory and lecture. *Prerequisite:* KINES 150, PHYSL 103, and CSB 234 or equivalent. 3 hours.

255. Biomechanical Analysis of Human Movement
Studies the biological and mechanical principles of human motor performance; analyzes selected movement skills in depth. *Prerequisite:* PHYSL 103, CSB 234, and MATH 112, or consent of instructor. 3 hours.

257. Coordination, Control and Skill
Introduction to the concepts and principles of the coordination and control of movement and the development of skilled action. The course will focus on such topics as fundamental movement activities; movement control processes; acquisition, retention and transfer of skill; and the role of constraints to action. These topics have implications for understanding skilled performance, motor development and human performance in general. *Prerequisite:* KINES 140 and 150 or consent of instructor. 3 hours.

262. Motor Development, Growth, and Form
Same as HDFS 262. Examination of the concepts of motor development, physical growth, and body form throughout the lifespan. Major emphasis is on the period of birth through adolescence. *Prerequisite:* KINES 140 and 150. 3 hours.

263. Physical Education Curriculum
The identification, selection, and organization of movement knowledge, and experiences into curricula for children and youth; emphasizes the decision-making process in curriculum development. *Prerequisite:* Junior standing. 3 hours.

267. Adapted Physical Education
Organization, administration, and conduct of physical education programs for the most prevalent types of medical conditions found in school settings; emphasis on analyzing motoric needs and prescribing programs of motor activity for special populations, including individuals with mental retardation and learning disabilities. *Prerequisite:* KINES 150 and 257, or consent of instructor. 3 hours.

268. Children's Movement
Introduction and overview of kinesiology principles and physical activity related to children. Laboratory portion of class focuses on the application of information to teaching physical activity to elementary school children. 3 hours. For non-kinesiology majors.

273. Instructional Strategies in Physical Education
Analyzes the teaching-learning process, emphasizing the identification of instructional strategies specific to the development of

skilled performance in movement activities. *Prerequisite:* KINES 257. 3 hours.

285. Supervised Experiences in Kinesiological Research
Supervised laboratory experiences in physical education research; individual work under the supervision of members of the faculty in their respective fields. The student assists with data collection, processing, and analysis for research in progress. *Prerequisite:* Consent of instructor. 3 hours. May be repeated to a maximum of 6 hours.

286. Supervised Experience in the Common School
Supervised practice in observing, assisting, and teaching children in elementary, junior high school, and senior high school. Emphasis is on understanding motor behavior, teacher-learner behavior, and interrelatedness with other aspects of the learning environment. *Prerequisite:* KINES 257 or equivalent. 2 or 3 hours. May be repeated for a total of 4 to 6 hours.

287. Supervised Experiences in the Agency Setting
Supervised practical experience in leadership roles in nonschool agency settings; emphasis on observing, planning, and conducting physical activity programs for children and/or adults in preschool, recreation, or other social agencies. 3 hours. May be repeated for a maximum of 6 hours.

288. Supervised Experiences in Athletic Training
Supervised practicum in the athletic training setting. Emphasis will be placed on student progression in the athletic training competencies. *Prerequisite:* KINES 120 and selection into Commission on Accreditation of Allied Health Education Programs. 1 hour. May be repeated for a maximum of 5 hours.

290. Honors Seminar
Same as CHLTH 290 and LEIST 260. Lectures and discussion dealing with issues in kinesiology, dance, health education, recreation education, and related fields. *Prerequisite:* James Scholar standing or grade-point average of 3.0. 2 hours. May be repeated for a maximum of 6 hours.

291. Special Problems
Special projects in research and independent investigation in any phase of health, kinesiology, physical education, and related areas selected by the students. *Prerequisite:* Junior or senior standing; grade-point average of 2.5; consent of faculty adviser, instructor, and head of department. 2 or 3 hours. May be repeated for a maximum of 6 hours.

293. Honors Senior Thesis
Planning, researching and writing of an honors thesis, under supervision of a faculty member, on a problem of appropriate scope and character. Paper will be presented at a suitable meeting and/or seminar. *Prerequisite:* Senior standing when enrolling; minimum GPA (total, University and Kinesiology prefix courses) of 3.25; a minimum of one full year (2 semesters) remaining at the University of

Illinois, Urbana-Champaign campus; and submission of a written proposal for approval at least 4 weeks prior to on-campus registration. 3 hours. May be repeated to a maximum of 6 hours.

301. Observation and Evaluation in Kinesiology

Examines the concepts of observation, measurement, and evaluation of human motor performance and functioning in physical activity contexts. *Prerequisite:* KINES 140 and 150, or consent of instructor. 3 hours or 1 unit.

320. Advanced Assessment of Athletic Injuries

Analyzes injury patterns and mechanisms for the various joints and body segments; emphasizes the nature of the injuries, clinical evaluation and therapeutic principles, the physiology of the healing process, and functional anatomy. *Prerequisite:* KINES 220, or consent of instructor. 3 hours or 1 unit.

321. Therapeutic Modalities in Athletic Training

Emphasis on instrumentation and application of therapeutic modalities in the laboratory setting including therapeutic heat, therapeutic cold, electrotherapy, traction, massage, hydrotherapy, pain control and postural alignment. *Prerequisite:* Credit or concurrent enrollment in KINES 320, or consent of instructor. 3 hours or 1 unit.

322. Neurophysiological Bases of Therapeutic Exercise

Examines neurological mechanisms underlying exercise performance with application to therapeutic programs. *Prerequisite:* PHYS 103 or CSB 234, or equivalent. 4 hours or 1 unit.

341. Games in Culture

Examines game phenomena as cultural action systems with special emphasis on the biosocial behavior expressed in varying societies; topics include game components, cultural contexts, ecological strategies, enculturation, acculturation, symbolism, change process, and maladaptive behavior. *Prerequisite:* KINES 244 or consent of instructor. 3 hours or 1 unit.

342. Body, Culture, and Society

Same as WS 342. Analysis of the significant social aspects of the human body including anthropological, historical, psychological and sociological perspectives. Places emphasis on cross-culture and cross-national studies of bodily behavior with particular stress on exercise, health and sport practices. *Prerequisite:* KINES 140; KINES 249 or equivalent; or consent of instructor. 3 hours or 1 unit.

343. Psychophysiology in Exercise and Sport

Same as PSYCH 346. Designed to give the student an understanding of the interaction between psychological processes and physiological parameters in exercise and sport. Examines psychophysiological exercise and sport research with particular attention to relevant models and theories. *Prerequisite:* Junior or senior standing, KINES 240, 347, 348, or consent of instructor. 3 hours or 1 unit.

346. Gender and Physical Activity

Same as WS 346. Examination of the gendered nature of physical activity in such contexts as physical education, sport, play, games, and leisure. Analyzes theoretical and methodological assumptions pertaining to gender and physical activity/sport contexts with particular attention on concepts of masculinity, femininity, role conflict, socialization influences and media representations of gender. The feminist critique of socio-cultural sport studies is also considered. *Prerequisite:* KINES 240 or consent of instructor. 3 hours or 1 unit.

347. Social Psychology of Sport

Same as PSYCH 349. Outlines the social psychological parameters which influence behavior and performance in sport; emphasizes the impact of social influences upon the individual within the sport context, including such factors as achievement motivation, competition, anxiety, aggression, and personality. *Prerequisite:* KINES 140; KINES 247 or equivalent; PSYCH 100, 103, or 105; PSYCH 201; or consent of instructor. 4 hours or 1 unit.

348. Exercise and Health Psychology

Same as CHLTH 348. Examines the psychological determinants and consequences of exercise and physical activity as a health promoting behavioral process. *Prerequisite:* Junior or senior standing or consent of instructor. 3 hours or 1 unit.

349. Sociology of Sport

Same as SOC 346. Sociological analysis of sport as a sociocultural system which progresses from the micro to the macro level; focuses on theoretical and conceptual issues in sociology of sport. *Prerequisite:* KINES 249 and 3 additional hours of sociology, or consent of instructor. 3 hours or 1 unit.

350. Biochemistry of Exercise

Introduces the metabolic and biochemical adaptation of the body in response to acute and chronic physical activity. Primary focus is given to the subcellular and enzymatic regulation and integration during exercise. Substrate metabolism, bioenergetics, hormonal action and nutritional influences as related to exercise are emphasized. *Prerequisite:* KINES 252 or BIOCH 350. 3 hours or 1 unit.

352. Clinical and Applied Exercise Physiology

Physical fitness appraisal and guidance in clinical and applied settings with emphasis on medical clearance, risk factor assessment, physical fitness assessment and exercise prescription. *Prerequisite:* KINES 252, or consent of instructor. 3 hours or 1 unit.

353. Body Composition, Evaluation, and Regulation

Examines the theoretical and technical aspects of measuring human body composition; introduces relevant techniques and instrumentation currently in use; reviews research methodology and findings pertaining to the effects of exercise conditioning and nutritional modification on body composition. *Prerequisite:* KINES 252 or equivalent; consent of instructor. 3 hours or 1 unit.

354. Growth and Physical Development of Children

Same as HDFS 354. Study of the growth and physical development of children through adolescence with emphasis on those systems and body composition changes related to motor performance and exercise stress. *Prerequisite:* PHYS 103 and CSB 234; KINES 301; or equivalent. 3 hours or 1 unit.

355. Quantitative Analysis of Human Motion

Quantitative mechanical analysis of human motion using film-based, video-based, and optical-electronic motion measurement systems. Basic mechanical concepts are presented using a vector algebra approach. The focus is on two-dimensional motion analysis with an introduction to three-dimensional techniques. *Prerequisite:* KINES 255 or consent of instructor. 3 hours or 1 unit.

356. Electromyographic Kinesiology

Focuses upon the biological components of volitional and reflexive movement in humans; theory and technology of electromyography are utilized to describe and quantify the neuromuscular input to the mechanical output. *Prerequisite:* PHYS 103 and CSB 234. 3 hours or 1 unit.

357. Motor Learning and Control

Discussion and analysis of scientific principles related to the learning and control of motor skills; review of related literature and research in motor learning and control. The focus of the course is on mechanisms for the control of movement and recent theories of how movements are acquired and performed. *Prerequisite:* PSYCH 100, 103, or 105; KINES 257; or consent of instructor. 3 hours or 1 unit.

359. Physical Activity and Aging

Examines aging and age-related changes in the cells, tissues, organs, and systems of the human body; emphasizes the role of physical activity and other lifestyle choices in modifying the aging process and in influencing the onset and progression of the chronic diseases which accompany aging. *Prerequisite:* KINES 252 or consent of instructor. 3 hours or 1 unit.

373. Strategies for Motor Skill Acquisition and Performance

Examines theory and practice related to structuring practice conditions to maximize the acquisition and performance of motor skills. The nature of skill, activities, and strategies for enhancing skill are discussed with particular emphasis placed on strategies that instructors, teachers, and/or coaches can use to enhance skill acquisition and performance. *Prerequisite:* KINES 257 or consent of instructor. 3 hours or 1 unit.

385. Clinical Experiences in Sports Medicine

Clinical experiences in medical supervision of sports programs, in the areas of therapeutic exercises, fitness programming, and cardiac rehabilitation. *Prerequisite:* Consent of instructor. Prerequisites are determined on an individual basis in accordance with the clinical experiences to be undertaken. 2 to 8 hours, or ½ to 2 units. May be repeated to a maximum of 8 hours or 2 units.

394. Special Topics in Kinesiology

Lecture course on topics of current interest; specific topics announced in the *Timetable*. *Prerequisite*: To be determined for each subject and indicated in the *Timetable*. 1 to 4 hours, or ¼ to 1 unit. May be repeated.

420. Issues in Sports Medicine

Addresses current issues in the medical aspects of sports; examples of these issues are epidemiology of injuries and treatment forms, use of sports equipment, questionable sports practices, and preventive techniques. *Prerequisite*: An exercise physiology course and KINES 320, or equivalent; or consent of instructor. 1 unit.

422. Kinesiotherapy

Analyzes pathomechanics underlying injury and orthopedic problems; also analyzes rehabilitation methods for orthopedic and neurological dysfunctions. *Prerequisite*: KINES 322 or consent of instructor. 1 unit.

447. Sport Psychology

Analysis of psychological factors and principles with special reference to motor performance, learning motor skills, perception, and emotion in sports situations; review of literature; and independent projects. *Prerequisite*: KINES 347 or consent of instructor. 1 unit.

451. Scientific Basis of Physical Performance

Contemporary trends in the study of human performance and exercise stress; analysis of the research literature, experimental strategies, and research instrumentation. Lecture-discussion and laboratory. *Prerequisite*: An exercise physiology course or KINES 354, or equivalent. 1 unit.

452. Neuromuscular Aspects of Human Performance

In-depth study of the neuromuscular aspects of human activity; focus on selected topics related to growth, physical development, exercise prescriptions, athletic conditioning, and fitness. *Prerequisite*: KINES 451. 1 unit.

453. Circulorespiratory Aspects of Physical Activity

Aerobic performance responses to short-term, intermittent, and prolonged physical activity; special consideration given to endurance training methods and assessment techniques, ergogenic aids, and problems associated with growth, environmental influences, and competitive sport. *Prerequisite*: KINES 451 or consent of instructor. 1 unit.

455. Experimental Kinesiology

Mechanical and neuromuscular approach to human movement; analysis and experimental research. *Prerequisite*: KINES 355 and 356, or consent of instructor. 1 unit.

461. Administration of Physical Education and Sport

Analysis of completed research relating to theory and practice of administration in physical education and sport; the development of policy statements and procedures manuals for the various educational levels; and experience in the use of the case plan of instruction as a teaching technique for the development of

competence and knowledge relating to human relations and administration in this specialized field. *Prerequisite*: Consent of instructor. 1 unit.

475. Leisure and Culture

Same as ANTH and LEIST 475. See LEIST 475.

490. Seminar

Lectures, discussions, and critiques on kinesiology and related subjects by faculty members and visiting professional leaders; presentation and criticism of student research. 0 credit. May be repeated in the same or subsequent semesters as topics vary. Approved for S/U grading.

493. Independent Study

Independent research on special projects; offered summers as a special group practicum. ½ or 1 unit.

494. Special Topics in Kinesiology

Lecture course in topics of current interest; specific subject matter announced in the *Timetable*. ½ or 1 unit. May be repeated.

495. Research Methods in Kinesiology

Review and appraisal of common research procedures; application of statistical procedures, library methods, evaluation procedures, and experimental methods. 1 unit.

499. Thesis Research

Preparation of theses in kinesiology. 0 to 4 units.

KOREAN

(See East Asian Languages and Cultures)

LABOR AND INDUSTRIAL RELATIONS

Director of Institute: Peter Feuille

Office: 247 Labor and Industrial Relations Building, 504 East Armory Avenue, Champaign

Phone: 333-1480

URL: www.ilir.uiuc.edu

Labor and Industrial Relations (L I R)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

301. European Working—Class History: 1750 to the Present

Same as HIST and SOC 301. See HIST 301.

315. The Economics of Poverty and Income Maintenance

Same as ECON 315. See ECON 315.

337. American Working Class History, 1780 to the Present

Same as HIST 337. See HIST 337.

341. Economics of Labor Markets

Same as ECON 341. See ECON 341.

345. Economics of Human Resources

Same as ECON 345. See ECON 345.

347. Labor Law, I

Same as LAW 357. See LAW 357.

355. Industrial Social Psychology

Same as PSYCH 355. See PSYCH 355.

357. Psychology of Industrial Relations

Same as PSYCH 357. See PSYCH 357.

360. Employee Benefit Plans

Same as FIN 360. See FIN 360.

362. Public Sector Labor Law

Same as LAW 362. See LAW 362.

409. Organizational Behavior

Same as B ADM 409. See B ADM 409.

420. Formation of Public Policy

Same as POL S 461. See POL S 461.

422. Government Regulation

Focuses on federal and state legislation, court and agency rulings, and executive orders that regulate a wide range of private and public employment practices including: Title VII and Affirmative Action Compliance; American with Disabilities Act; drug-, HIV-, and genetic testing; Fair Labor Standards Act; Civil Service procedures; Equal Pay Act, Family and Medical Leave Act, and employment-at-will; constitutional protection for employees, job-applicants, and others. *Prerequisite*: L I R 347 or 491, or consent of instructor. 1 unit.

430. Foundations of Industrial-Organizational Psychology

Same as PSYCH 430. See PSYCH 430.

435. Motivation and Morale in Industry

Same as PSYCH 435. See PSYCH 435.

440. Labor Economics

Same as ECON 440. See ECON 440.

441. Labor Economics

Same as ECON 441. See ECON 441.

442. Collective Bargaining

Same as ECON 442. Examination of: social values and social science concepts to develop a framework for explaining the basis and shape of collective bargaining as it has been practiced in the United States; government and law, unions, and employers as part of the development of this framework; the environment of collective bargaining with respect to the role of economics and bargaining structure; the negotiating process as the interactive basis for union-management relations; conflict and conflict resolution as part of the negotiating process; wage and other effects of collec-

tive bargaining as bargaining outcomes; contemporary changes in union management relations. Case materials and exercises may be used to supplement course materials. *Prerequisite:* Consent of instructor. 1 unit. Graduate credit not given for both ECON 343 and L I R 442.

443. Workplace Dispute Resolution

Same as ECON 443 and LAW 361. Examination of the use of procedures to resolve employment disputes in both union and non-union workplaces; comparative analysis of grievance arbitration, interest arbitration, mediation, fact-finding, and combinations of these procedures; special emphasis given to the role of third party intervention. 3 hours or 1 unit. Hourly credit only applicable to LAW 361.

445. Investment in Human Resources

Same as HRE 445. Activities that influence future monetary and psychic income by improving the resources in people; coverage of investments, including schooling, on-the-job and other training, migration, and the search for information on jobs and incomes; emphasis on human capital concepts, public human resources policy, and equal employment opportunity policy. *Prerequisite:* An introductory course in economics and in quantitative methods, as specified by the department. 1 unit.

448. Problems of Personnel Management

Same as B ADM 411. See B ADM 411.

451. Labor Law and Public Policy

Same as LAW 360. Analyzes current major policy issues in labor relations and employment law through the concepts and techniques of the lawyer and the labor relations specialist. *Prerequisite:* For law students, LAW 357 or consent of instructor; for Institute of Labor and Industrial Relations and other graduate students, one semester of labor and industrial relations course work or consent of instructor. 3 hours or 1 unit. Hourly credit only applicable to LAW 360.

454. Comparative Employment Relations Systems

Same as LAW 356. Examines employment systems in selected developed, newly industrialized, and developing economies. Explores employment systems in the context of regional and political integration. Topics include the organization and policies of unions and employers, as well as management-labor relations, and the roles of firms, national governments, and international organizations in shaping employment systems. Emphasis will be placed on the analytical tools needed to make multicountry comparisons, to link theory and practice, and to understand the reasons for major changes in the nature of the employment relations. 3 hours or 1 unit. Hourly credit only applicable to LAW 356.

455. Labor in Less Developed Countries

Role and place of LDCs in the world; colonialism, independence, and nation-building; economics, power, and stratification; development of labor markets and labor movements; economic, political, and social consequences of international trade, finance, and invest-

ment; international diffusion of technology and ideology; nation-states, multinational corporations and world community; and international and regional organizations and their impact on labor in LDCs. *Prerequisite:* ECON 101 or 109, or equivalent. 1 unit.

456. Industrial Relations Theory

Integrated analysis of the principles of industrial relations through the study of the works of the major theorists and their critics. *Prerequisite:* Consent of instructor. 1 unit.

457. Human Resources Theory

Continuation of L I R 456. Focuses on contemporary research in human resource management and related fields. *Prerequisite:* L I R 456. 1 unit.

458. Faculty-Student Workshop

Training and experience for Ph.D. students in the application of social science and industrial relations theory and research methodology to contemporary industrial relations problems through presentation and discussion of faculty and student research. Ph.D. students are required to make presentations and to participate in workshop discussions during the entire period of their campus residency. *Prerequisite:* L I R 456 and 457. 0 to 1 unit.

461. Compensation Systems

Compensation theory and practice. Course addresses the theoretical and practical issues associated with the design of effective compensation systems. The design phases include establishing internal equity, external equity, and individual equity. Budgeting and administration are also addressed. Case analyses and computer simulations may be used to supplement course materials. 1 unit.

462. Human Resources Planning and Staffing

Examines conceptual issues, policies, and practices relating to the attraction, selection, development, and planning for the most effective utilization of human resources. 1 unit.

463. Human Resource Information Systems and Computer Applications in Industrial Relations

Design, implementation, and evaluation of human resource information systems (HRIS). Topics to be covered include fundamental database characteristics, information systems and management processes, systems analysis and needs assessment in Human Resources and Industrial Relations departments, implementing HRI systems, the use of HRI systems to solve organizational problems, information systems and labor relations. A series of cases and computer exercises which will play a major role in determining the course grade will be used. Regular seminars and some laboratory sessions will be scheduled throughout the semester. *Prerequisite:* Graduate standing in Labor and Industrial Relations or consent of instructor. 1 unit.

464. Human Resource Training and Development

Examination of: theories of behavioral change; application of these theories to training and human resource development; assessing train-

ing needs, especially with reference to the internationalization of business, changes in labor demand, demographic trends in the United States, and increasing work force diversification; advantages and disadvantages of the various training and development techniques; relation of training to organizational strategies; methods of training evaluation. Special attention is given to the need for and methods of cross-cultural training. Students develop training exercises for class presentation and participation. 1 unit.

465. Human Resources Management and Strategy

Same as B ADM 414. Designed to provide integration across the specific functional areas of the human resources management (HRM) field, while at the same time demonstrating the linkages horizontally within HRM and vertically with strategic management of the firm. This case-focused course places emphasis on human resources issues of strategic importance to the organization. *Prerequisite:* One prior course from the Organizational Behavior and Personnel Management distribution subject area list (in the AM degree requirements for the graduate degree in Labor and Industrial Relations). 1 unit.

466. International Human Resource Management

Human resource management issues examined from the perspective of the multinational firm. Topics include globalization and human resource strategy, management and the structure of multinational firms, dealing with intercultural differences, selecting employees for foreign assignments, training and developing expatriate employees, evaluation and compensation of employees in international assignments. Individual and group projects. *Prerequisite:* Graduate standing. 1 unit.

467. Negotiation in Human Resource Decisions

General survey course concerning the strategies and tactics of bargaining and negotiation, with special emphasis on applications in human resource management contexts. Topics covered will include: the structure of negotiated outcomes; integrative bargaining tactics; distributive bargaining tactics; negotiation planning; power, persuasion and influence; communication; negotiating in teams and groups; negotiating using 3rd parties (arbitrators, mediators, agents); cross-cultural negotiations. Students will discuss negotiation issues and build negotiation skills through a series of experiential exercises and cases. *Prerequisite:* Graduate standing. An introductory course in social psychology or organizational behavior is preferred but not required. 1 unit. Students may not receive credit for both this course and Master of B ADM 405 (Section J: Managerial Negotiations.).

490. Individual Topics

Students in labor and industrial relations may register for this unit with the consent of the curriculum adviser and the adviser under whom the student will perform individual study or research. Such individual work may include special study in a subject matter for which no course is available or an individual

research project, including on-the-job research in industry, which is not being undertaken for a thesis. *0 to 2 units.*

491. Employment Relations Systems

General framework for the analysis of employment relationships. Topics include industrial relations theory, the American system of collective bargaining, intercountry system differences, and human resource management strategies and practices. *Prerequisite:* Graduate standing. *1 unit.*

492. Research Methods in Labor and Industrial Relations

Systematic analysis of theories and procedures of the various social and physical sciences bearing on research in labor and industrial relations; primary emphasis on the process of integrating the approaches and techniques of the various social sciences with respect to the study of problems in labor and industrial relations as met in practice in management, the union, and government service, as well as in teaching and research in the field. *Prerequisite:* Major in social sciences or consent of instructor. *1 unit.*

493. Quantitative Methods in Labor and Industrial Relations

Application of statistical methods to problems in human resources and industrial relations. Analysis and presentation of results using computer software. Covers statistical techniques through analysis of variance and multiple regression. *Prerequisite:* Any elementary statistics course. *1 unit.*

494. Tutorial Seminar

Research experience for Master's students in carrying out a problem solving project from formulation to written report in a chosen area of labor and industrial relations. Each student selects an individual topic with the approval and guidance of a faculty member and participates in a Tutorial Workshop. *Prerequisite:* Completion of no fewer than 6 units of L I R course work. *0 or 1 unit.*

496. Workers, Managers, and Unions in Historical Perspective

Social and political history of North American workers and their relations with employers and government from the 1860's to the present. Focuses especially on the impact which the changing labor force had on the formation of labor organizations and on labor management relations throughout the last century. *Prerequisite:* Graduate standing in L I R or consent of instructor. *1 unit.*

498. Designing High-Involvement Workplaces

Intensive analysis of strategies for enhancing the involvement and commitment of employees in work organizations. Focus is on the design of jobs, work teams, feedback programs, and reward systems that contribute to employee well-being and to organizational effectiveness. *1 unit.*

499. Thesis Seminar

For all students writing theses in L I R at the A.M. and Ph.D. levels. *0 to 4 units.*

L A T I N

(See Classics)

L A N D S C A P E A R C H I T E C T U R E

Head of Department: Vincent J. Bellafiore
Department Office: 101 Temple Hoyne Buell Hall, 611 East Lorado Taft Drive, Champaign
Phone: 333-0176

Landscape Architecture (L A)

101. Introduction to Landscape Architecture

Survey of the practice, profession, and philosophy of landscape architecture. *2 hours.*

133. Basic Landscape Design

Introduction to the fundamentals of design, including studies in two- and three-dimensional abstract and applied problems, basic elements and procedures of design, and principles of landscape composition. *Prerequisite:* Credit or concurrent registration in L A 180, or consent of instructor. *5 hours.* Open to Landscape Architecture majors only.

134. Site Design

Principles and practices of site planning; orientation, circulation, and land use definitions and relationships applied to site scale problems; and application of site design process. Field trip required; see *Timetable* for current fees. *Prerequisite:* L A 133 or consent of instructor. *5 hours.*

142. Landform Design and Construction

Introduction to the fundamentals of the earth's surface as a design element; limitations and uses of landforms; and methods of grading, surface drainage, and land surveying. *Prerequisite:* MATH 114 or 116. *3 hours.*

150. Introduction to Environmental Factors in Design

Principles and practices of identifying, analyzing, and recording landscape resources. Field trip required; see *Timetable* for current fees. *Prerequisite:* GEOG 103 or consent of instructor. *3 hours.*

170. Introduction to Behavioral Factors in Design

To provide an understanding of how outdoor settings affect human behavior and how socially responsible design can result. Short exercises, field trips, and evaluation of open spaces will enable students to apply the above concepts. *3 hours.*

180. Design Communications, I

Basic principles and techniques of visual communication in landscape architectural rendering, including computer-based techniques. *Prerequisite:* Concurrent registration in L A 133. *3 hours.* Open to Landscape Architecture majors only.

181. Design Communications, II

Advanced principles and techniques of visual communication in landscape architectural rendering, including computer-based techniques. *Prerequisite:* Concurrent registration in L A 134; L A 180 and completion of campus Composition I general education requirement or consent of instructor. *3 hours.*

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Senior Honors Course

Independent guided study and research in a selected area of landscape architecture; for candidates for honors in landscape architecture. *Prerequisite:* Senior standing in landscape architecture, a university grade-point average of 3.0, and consent of head of department. *1 to 6 hours.* May be repeated to a maximum of 9 hours.

214. History of Landscape Architecture

Analysis of the development of landscape architecture as a result of environmental and cultural influences. *3 hours.*

215. Buildings, Land, and Cultural Traditions: Diversity and Change

Same as ARCH 215. Introduction to the ordinary landscape as a product of interaction between a physical base, technology, and cultural attitudes and values. Approach is both historical, from prehistory to science-fiction, and thematic, treating issues such as meaning, symbolism, power and gender, and ethnicity. *Prerequisite:* Sophomore standing. *3 hours.*

216. Nature and American Culture

Same as HIST, LEIST, and NRES 242. See LEIST 242.

235. Recreation and Community Design

Development of design solutions at site and master plan scale relative to community, urban and recreational problems; emphasizes development of analysis and design techniques. Field trip required; see *Timetable* for current fees. *Prerequisite:* L A 134 or consent of instructor. *5 hours.*

236. Design Workshops, I

Project design at various scales utilizing problems of a wide range of complexity and subject matter; concerns rural, community, and urban problems, housing, recreation, and open space; emphasizes problem analysis and generation of innovative design alternatives. Students select from several sections depending on specific interests. *Prerequisite:* L A 235 or consent of instructor. *5 hours.*

243. Site Engineering

Principles of surveying and design of drainage, circulation, and utility systems. *Prerequisite:* L A 142 and MATH 114 or 116; or consent of instructor. *4 hours.*

244. Landscape Construction

Construction methods, materials, and procedures related to the design of landscape structures; development of design details and cost estimating. *Prerequisite:* L A 243 or consent of instructor. 4 hours.

245. Professional Internship

Professionally supervised field experience in private firms and public agencies designed to introduce students to professional practice. Students work in a department-approved firm or agency of their choice either during a regular or summer session. *Prerequisite:* Junior standing and consent of instructor. 1 to 3 hours. May be repeated in separate semesters to a maximum of 3 hours.

246. Professional Practice

Study of the profession of landscape architecture including an introduction to modes of practice, career evolution, organizational theory, office procedures, project management and professional ethics. *Prerequisite:* Junior standing or consent of instructor. 2 hours.

252. Planting Design I

Biogeography; identification of native species, evergreens, and exotics; uses of plants in the landscape; and planting design projects. Field trips required. *Prerequisite:* NRES 254. 3 hours.

253. Planting Design II

Planting design philosophies; detailed and comprehensive design projects; management practices; technical documents; and plant identification. Field trips required. *Prerequisite:* L A 252. 3 hours.

290. Special Problems

Supervised independent study, research, or special project in a selected area related to landscape architecture. *Prerequisite:* Junior or senior standing; consent of instructor and head of department prior to advance enrollment and registration. 1 to 6 hours. May be repeated to a maximum of 9 hours.

299. Off-Campus Study

Provides campus credit for off-campus study. *Prerequisite:* Junior standing; prior review and approval of the student's written proposal by a faculty committee and the department head. 0 to 15 hours (summer session, 0 to 6 hours). Final determination of appropriate credit is made by a faculty review committee upon completion of the student's work. Maximum credit, 15 hours (summer session, 6 hours), all of which must be earned within one semester.

325. Historical Geography of American Landscapes to 1880

Same as GEOG 325. See GEOG 325.

326. Historical Geography of American Landscapes Since 1880

Same as GEOG 326. See GEOG 326.

327. American Vernacular: The Cultural Landscape

Same as GEOG 327. See GEOG 327.

337. Regional Landscape Design

Introduction to the process of physical planning, emphasizing land use policy and plan formulation; a regional case study is undertaken to develop analytical skills, to introduce the relationship between cultural and natural processes, and to explore the need for responsible political action. *Prerequisite:* L A 236 or consent of instructor. 5 hours or 1½ unit.

338. Design Workshops, II

Project design at various scales utilizing problems of a wide range of complexity and subject matter; concerns rural, community, and urban problems, housing, recreation, and open space; and emphasizes problem analysis and generation of innovative design alternatives. The student selects from several sections depending on specific interests. *Prerequisite:* L A 235 or consent of instructor. 5 hours, or ¾ to 1½ units.

341. Land Resource Evaluation

Same as U P 341. Examines concepts for the value of land, land resource problems and policy responses, methods for evaluating land resource development and policy alternatives, and case studies of land resource evaluation. *Prerequisite:* Graduate standing or consent of instructor. 4 hours or 1 unit.

344. Social Impact Assessment

Same as ENVST, LEIST, NRES, R SOC, and U P 344. See LEIST 344.

350. Land Use Ecology

Ecological implications of alternative land use patterns; equipment, field techniques, and nomenclature in current use by environmental consultants; and elements of a baseline ecosystem study. *Prerequisite:* Consent of instructor. 3 or 4 hours, or ¾ or 1 unit.

370. Design-Behavior Interaction

Critical discussion of notions and theories pertaining to the reciprocal effects of landscape architectural design and human behavior. 3 hours or ¾ unit.

417. Land and Society: History, Theories, and Problems

Historical and cross-cultural investigation of the use, shaping, and perception of the land-based environment; case studies, critical problems and issues, and theories of social-environmental interaction. *Prerequisite:* Consent of instructor. 1 unit.

437. Landscape Planning

Small group design and planning studio emphasizing actual problems and clients; projects require fieldwork, analysis, problem-solving, design, and presentation to client. *Prerequisite:* L A 341 and 350, or consent of instructor. 1½ units.

440. Public Involvement in Resource Management and Environmental Planning

Same as ENVST, LEIST, NRES, R SOC, and U P 440. See NRES 440.

442. Spatial Design Methods

Same as U P 442. Representations and solution procedures for problems involving the

arrangement of land use activities in space; optimizing, approximate, and graphic methods, their applications, effectiveness, and efficiency; and experiments with computerized procedures. *Prerequisite:* L A 341 or consent of instructor. 1 unit.

450. Environmental Impact Statements

Requirements of the National Environmental Policy Act and Guidelines from the Council on Environmental Quality for preparing and writing environmental impact statements; includes interdisciplinary team efforts and impact assessment techniques. *Prerequisite:* Graduate or law school standing, or consent of instructor. 1 unit.

463. Methods of Social and Behavioral Research in Designed Environments

Same as ARCH 463. See ARCH 463.

464. Conducting Social and Behavioral Research in Designed Environments

Same as ARCH 464. Each student prepares and conducts research to obtain information about specific relationships between people and the designed environment. *Prerequisite:* L A 370 or ARCH 323, and ARCH 463, or equivalent; and a course in introductory statistics. 1 unit.

465. Design/Behavior Studio

Same as ARCH 465. Development of site or project scale design emphasizing the integration of user needs and behavioral factors. *Prerequisite:* L A 464, or consent of instructor. 1½ units. May be repeated to a maximum of 3 units.

481. Urban Design Studio, I

Same as ARCH 481. See ARCH 481.

482. Urban Design Studio, II

Same as ARCH 482. See ARCH 482.

483. Historical Ecology of Human Settlements

Same as GEOG and U P 483. See U P 483.

487. Seminar

Preparation, presentation, and discussion of research papers on current and future areas of landscape architectural application. *Prerequisite:* Consent of instructor. ½ to 1 unit.

490. Special Problems

Nature and scope of projects to be determined by consultation between student and faculty adviser; open to landscape architecture majors as well as those from other disciplines who wish to engage in interdisciplinary work. *Prerequisite:* Consent of instructor. ½ to 2 units.

498. Master's Project

Major independent or small-group project synthesizing knowledge from previous course work. *Prerequisite:* Consent of instructor and program adviser. 0 to 2 units.

499. Thesis Research

Prerequisite: Graduate standing in landscape architecture. 0 to 2 units.

LATIN AMERICAN AND CARIBBEAN STUDIES

Acting Director of Center: Cynthia Radding
Center Office: 201 International Studies Building,
 910 South Fifth Street, Champaign
Phone: 333-3182

Latin American and Caribbean Studies (LA ST)

170. Introduction to Latin America

Interdisciplinary introduction to the ways of life of Latin American peoples, their origins and current expressions; discusses social, economic issues, and domestic and international policies related to them in the context of other Third World societies. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

290. Individual Study

Major tutorial normally taken in the senior year. Students read the works on a reading list devised in consultation with a faculty tutor and write a term paper. *Prerequisite:* LAST 170; a declared major in Latin American and Caribbean Studies; consent of instructor. 1 to 5 hours. May be repeated as topics vary to a maximum of 6 hours. (Counts for advanced hours in L A S.)

295. Special Topics

Topical survey of social, economic, and political factors in Latin American life. Each semester a particular topic is considered. *Prerequisite:* A basic course in a social science discipline. 2 to 4 hours.

345. Tutorials in Native Latin American Languages

Upon the consent of the Director of the Center for Latin American and Caribbean Studies, tutorials are available in special native Latin American languages not regularly offered by the University. Tutorials at the elementary, intermediate, and advanced levels may be arranged. Students registering for unit credit for the first two semesters must first present satisfactory evidence of knowledge of the language at the elementary level, either in the form of credit earned at another institution or by passing a proficiency examination. *Prerequisite:* Consent of instructor. 2 to 4 hours, or ½ to 1 unit. May be repeated up to 6 semesters successively to a maximum of 16 hours or 4 units. Graduate credit is given only for work beyond the elementary level.

376. Four Latin American Ideas: Structuralism, Dependency, Liberation Theology, Pedagogy of the Oppressed
 Same as HIST 370. See HIST 370.

450. Interdisciplinary Seminar in Latin American Studies

Designed for students in the Latin American Studies M.A. program. Examines the interconnections among research approaches and problems in the field of Latin American Studies. *Prerequisite:* M.A. standing in Latin American and Caribbean Studies, or consent of instruction. 1 unit. May be repeated to a maximum of 2 units as topic varies.

499. Thesis Research

Preparation of M.A. thesis. *Prerequisite:* M. A. standing in Latin American and Caribbean Studies and consent of instructor. 1 unit. May be repeated to a maximum of 2 units in the same semester with consent of M.A. program director.

LATINA/LATINO STUDIES

Acting Director: Louis DeSipio
Program Office: 510 East Chalmers Street,
 Champaign
Phone: 265-0370
URL: www.lls.uiuc.edu

Latina/Latino Studies (LLS)

100. Introduction to Latina/Latino Studies

Interdisciplinary introduction to the basis for a Latina/Latino ethnicity in the United States. Topics include immigration and acculturation experiences and their commonalities and differences, comparison of Latina/Latino experiences to those of other racial, ethnic and immigrant groups, and the potential for a pan-ethnic identity. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Introduction to 19th Century U.S. Latina/Latino Literature

Focuses on the fiction (historical novels and poetry) as well as the critical essays of the 1848 Mexican-American War and the 1898 Spanish-American War, the two key 19th century events that determined the status of the people of Caribbean and Mexican descent in the United States. 3 hours. Students may not register for LLS 200 and 201 simultaneously.

201. COMP II/Introduction to 19th Century U.S. Latina/Latino Literature

Course is identical to LLS 200 except for the additional writing component. See LLS 200. *Prerequisite:* Completion of campus Composition I general education requirement. 4 hours. Credit is not given for both LLS 200 and 201.

202. The Chicano Experience

Same as SPAN 202. See SPAN 202.

227. Latina/Latinos in Contemporary United States Society

Same as SOC 227. See SOC 227.

230. Introduction to U.S. Racial and Ethnic Politics

Same as AFRO and POL S 230. See POL S 230.

242. Topics in U.S. Latina/Latino Literature

Same as SPAN 242. See SPAN 242.

251. Mexican Americans: Ethnicity, Culture, and Identity in the United States

Same as HIST 251. See HIST 251.

252. Caribbean Latina/Latino Migration: Puerto Ricans, Cubans, and Dominicans in the United States

Same as HIST 252. See HIST 252.

259. Spanish-Speaking Peoples in the United States

Same as ANTH 259. See ANTH 259.

269. Latinas and Latinos Challenging the Anthropological and Literary Landscape

Same as ANTH 269. See ANTH 269.

275. History and Development of Latina/Latino Media in the United States

Same as COMM 275. See COMM 275.

290. Independent Study

Special topics not treated in regularly scheduled courses; designed especially for advanced undergraduates. *Prerequisite:* One course in Latina/Latino Studies and consent of instructor. 0 to 3 hours. May be repeated in the same or subsequent semesters as topics vary to a maximum of 6 hours.

296. Topics in Latina/Latino Studies

Course examines specific topics in Latina/Latino Studies not addressed in regularly offered courses. Examples include theories of ethnic identity, historical foundations, cultural expression, and relevant topics in public policy studies of Latina/Latino communities. 3 hours. May be repeated in same or separate semesters to a maximum of 6 hours.

325. Latina/Latino Politics

Same as POL S 325. See POL S 325.

333. Foundations of Bilingual Education

Same as C & I 333. See C & I 333.

335. Latina/Latino Families and Children in the United States

Same as HDFS 335. See HDFS 335.

349. Issues in Latina and Latino Education

Same as C & I 349. See C & I 349.

367. History of the American West: A Legacy of Conquest and Resistance

Same as HIST 367. See HIST 367.

LAW

Dean of College: Thomas M. Mengler
 College Office: 202D Law Building, 504 East
 Pennsylvania Avenue, Champaign
 Phone: 333-0176
 URL: www.law.uiuc.edu

Law (LAW)

301. Contracts

Enforceability of promises including unjust enrichment and reliance, offer and acceptance, mistake, unfairness and overreaching, unconscionability, Statute of Frauds, interpretation of contract language, conditions, and third party beneficiaries. 4 hours or 1 unit.

303. Torts

Basic course in civil wrongs, including intentional torts (such as assault and battery), negligence (duty, unreasonable risk analysis, actual and proximate cause), and strict liability. 3 hours or 1 unit.

304. Constitutional Law, I

Spring semester first-year course provides an introduction to constitutional law, including the origins of judicial review, basic Article III limits on federal court jurisdiction, the nature and scope of federal legislative power, the Commerce Clause, and the relationship of the federal government to the states. 3 hours or 1 unit.

305. Property

Basic first-year course in property law, required of all students. Provides an overview of law of the land, with incidental coverage of personal property; includes the concept of property, acquisition of private property, recognized property interests, and gratuitous transfer of property interests. 4 hours or 1 unit.

307. Criminal Law

Sources and purposes of the criminal law; the meaning of criminal responsibility; and the characteristics of particular crimes. 3 hours or 1 unit.

308. Criminal Procedure

Problems in the administration of criminal justice with emphasis on right to counsel, arrest, search, interrogation, lineups, and the scope and administration of exclusionary rules. 3 hours or 1 unit.

309. Civil Procedure

Role and importance of procedure in litigation, including jurisdiction, pleadings and parties, pretrial motions and discovery, trial practice (except evidence), relationship between judge and jury, the effect of a decision in one case on subsequent litigation between the same or different parties (*res judicata*), verdicts and judgements, and appellate review. 4 hours or 1 unit.

310. Statutory Interpretation

Introduces students to the legislative process, as well as to basic methods of statutory interpretation. Students select from several sections, each focusing on a different statutory scheme. Within that statutory context, students study basic canons of statutory interpretation, the uses of legislative history, and other issues arising in the application and interpretation of statutes. *Prerequisite:* Enrollment in the College of Law. 3 hours or 1 unit.

311. Legal Writing and Research

Emphasis on development and improvement of skills in legal writing, and training in legal bibliography. Assignments may include brief writing and preparation of legal memoranda and opinions. 2 hours or ½ unit.

312. Introduction to Advocacy

Continuation of the first semester Legal Writing and Research (LAW 311) course. Introduction to Advocacy is required in the second semester of the first year for further development of legal research skills persuasive writing and oral advocacy. Each student will work on the preparation of a summary judgment motion and an appellate brief relating to their first-semester assignment, then argue their assigned case before a panel of local attorneys and faculty. 3 hours or ½ unit.

313. Constitutional Law, II

This elective for second- and third-year law students studies constitutional notions of state action; substantive due process and equal protection; procedural due process; and the congressional power to enforce civil rights. Study of the rights guaranteed by the First Amendment is not part of this course (see LAW 315). *Prerequisite:* LAW 304. 3 hours or 1 unit.

314. Administrative Law

Functions of administrative tribunals in federal, state, and municipal government; the procedure before such administrative tribunals; and judicial relief from administrative decisions. 3 hours or 1 unit.

315. Constitutional Law, III

This elective for second- and third-year law students is an intensive study of the First Amendment to the Constitution and its application to the states through the Fourteenth Amendment. Examines decisions of the U.S. Supreme Court in areas concerning freedom of speech, religion, and the press. Specific topics include punishment of criminal advocacy; regulation of picketing and public demonstrations; obscenity; commercial speech; regulation of news media; and religious exemptions from government regulation. *Prerequisite:* LAW 304. 3 hours or 1 unit.

316. Constitutional Litigation

Study of the federal statutes that authorize civil suits against public officials and governmental entities responsible for the deprivation of constitutional rights; immunities and defenses; potential remedies; federalism issues. 2 to 3 hours, or ½ to 1 unit.

317. Advanced Criminal Procedure

Problems in the administration of criminal justice, with emphasis upon the commencement of formal proceedings (bail, decision to prosecute, grand jury, preliminary hearing, location of prosecution, scope of prosecution, speedy trial); the adversary system (pleas, discovery, jury trials, prejudicial publicity, ethical problems, double jeopardy); and post-conviction review (post-trial motions, appeals, habeas corpus, related post-conviction remedies). *Prerequisite:* LAW 307, 308 and 313. 3 hours or 1 unit.

318. Legislation

Constitutional and statutory issues in legislative procedure, including issues relating to separation of power between Congress and the President; particular legislative-executive issues raised by the Illinois Constitution; and techniques of legislative drafting and the interpretation of statutes. 2 to 3 hours, or ½ to 1 unit.

319. Environmental Law and Policy, I

Course is the basic introduction to Environmental Law; it considers the principal legal approaches used to deal with environmental problems, including common-law, statutory, regulatory, and economic-incentive systems. 3 hours or 1 unit.

320. Natural Resources

Legal problems associated with the use of certain land, water, and mineral resources, including energy sources; emphasizes public management and regulation. 2 or 3 hours, or ½ or 1 unit.

321. Urban Government

The law governing the structure, powers, and operation of local governments in urban and suburban areas with analysis of political, economic, and social implications. 3 hours or 1 unit.

322. Land Use Planning

Examination of the legal and administrative aspects of land development and regulation in an urban society, including the techniques and problems of planning; the tools of plan effectuation, such as zoning, subdivision regulation, renewal and redevelopment, and housing programs; and the allocation of decision-making among various levels of government. 2 to 3 hours, or ½ to 1 unit.

323. American Indian Law

Historical survey of congressional policy toward Indian affairs; studies relevant legislation delineating the relationship between tribes and the federal government; considers the unique jurisdictional problems that arise with conflicting claims of state, federal, and tribal sovereignty and regulatory authority; focus on individual rights and benefits conferred by federal law to American Indians, including Indian welfare laws, employment preference systems, and religious freedom legislation. 3 hours or 1 unit.

324. Real Property Transactions

Elective for second- and third-year law students introduces various issues relating to real property, transfers, including real estate

contracts, conveyancing and title protection. *Prerequisite:* LAW 305. 3 hours or 1 unit.

325. Elder Law

Examines the various legal implications of people living longer, with special emphasis on public policies and programs affecting the financing of medical care, housing arrangements, and income maintenance of persons aged 60 years and older. *Prerequisite:* LAW 348 is recommended. 3 hours or 1 unit.

326. Quantitative Methods in Legal Decisionmaking

Directed at equipping law students with quantitative skills that will assist them in the practice of law. Topics that will be covered include the following: business concepts in the law (e.g., reading a balance sheet, the importance of and methods of computing net, internal, and real rates of return); statistical and other quantitative methods in the law (e.g., using statistical evidence and employing decision theory as a guide to litigation strategy); the theory and methods of computing compensatory damages; and methods of finding and using expert witnesses on economic issues. 3 hours, or 1 unit.

327. Advanced Bankruptcy and Creditors' Rights

Selected issues in bankruptcy and creditors' rights not covered in LAW 339, with emphasis depending on current significance; examination of business reorganizations under Chapter 11 of the Bankruptcy Code, generally including jurisdictional issues and problems related to the filing of the case, the participants in the Chapter 11 process, operating a business under Chapter 11, and formulating and confirming a reorganization plan. *Prerequisite:* LAW 339. 3 hours or 1 unit.

328. Business Organizations

Examines the basic legal consequences for individuals, organizations, and society of the formation, control, and financing of organizations. Surveys agency relationships, partnerships, and close and public corporations. 3 or 4 hours, or 1 unit.

329. Securities Regulation

Explores the federal securities laws governing issuance of securities in the primary markets. Emphasis on regulatory requirements governing corporate financing. *Prerequisite:* LAW 328. 3 hours or 1 unit.

330. Antitrust Law

The limitations imposed by the Sherman Act, Clayton Act, and Federal Trade Commission Act on anticompetitive practices by business firms; emphasizes price fixing, monopolization, mergers, exclusive dealing, tying arrangements. 3 hours or 1 unit.

331. Business Planning

Examination of planning situations wherein tax, corporations, corporate finance, securities regulation, and accounting materials are interrelated; organization of close corporations and public companies, corporate distributions and recapitalizations, sale of corporate businesses, corporate acquisitions and mergers, and corporate separations; and problems re-

quiring written opinions and solutions. *Prerequisite:* LAW 348 and 351. 2 or 3 hours, or ½ or 1 unit.

332. Market Regulation

Explores the federal securities laws governing trading of corporate securities on secondary markets. Topics include insider trading, takeovers and proxy contests, regulation of exchanges and broker-dealers, and international securities transactions. *Prerequisite:* LAW 328. 3 hours or 1 unit.

333. Corporate Finance

Analysis of corporate and securities law problems using the tools of modern financial theory. Emphases will typically include valuation, capital structure, and fundamental changes of public corporations. *Prerequisite:* LAW 328. 3 hours, or 1 unit.

334. Government Regulation

The legal and policy implications of government regulation. Course content varies from a survey of laws regulating various industries to a detailed focus on a specific industry. 2 to 3 hours, or ½ to 1 unit.

335. International Business Transactions

Doing business abroad: export-import regulations, use of foreign commission merchants, licensing of patents and know-how, investment and exchange problems, establishing a foreign operation (including forms of business organization available abroad), and application of United States and foreign antitrust law to the business operation. 3 hours or 1 unit.

336. Regulation of Financial Institutions

The framework of federal and state regulation of the structure and activities of financial institutions, with emphasis on banks and other depository institutions. Topics include relevant provisions of the National Bank Act, Federal Reserve Act, and Bank Holding Company Act as well as the regulatory policies of the Comptroller of the Currency and Federal Reserve Board. Consideration is given to the issues presented by "deregulation," including developments relating to branch banking, interstate banking, and brokerage and underwriting activities as well as regulation of international banking activities. 2 to 3 hours, or ½ to 1 unit.

337. Article 9 (Personal Property Security)

Study of secured transactions under Article 9 of the Uniform Commercial Code. 2 to 3 hours, or ½ to 1 unit.

338. Real Estate Finance

Methods of financing land acquisition and residential and commercial development, including publicly owned and subsidized housing. 3 hours or 1 unit.

339. Creditors' Rights

The legal regulation of the relationship among debtors and their creditors and among creditors of a particular debtor; pre- and post-judgment remedies of unsecured creditors; debtors' attempts to defeat creditors, including fraudulent conveyances; study of Bankruptcy Code chapters 7 (liquidation) and 13 (adjustment of debts by individuals), and an

introduction to chapter 11 (reorganization). 3 hours or 1 unit.

340. Payment Systems

Study of problems involved in the use of checks and promissory notes with special emphasis on Articles 3 and 4 of the Uniform Commercial Code, including electronic funds transfers and letters of credit. 2 to 3 hours, or ½ to 1 unit.

341. Trademark, Unfair Competition and Consumer Protection

Course introduces basic legal concepts relating to statutory and common-law trademark, interference with contractual relations and trade libel, the federalization of unfair competition law, and the role of the Federal Trade Commission in consumer protection activities. 3 hours or 1 unit.

342. Copyright Law

Offers an in-depth look at the legal aspects of copyright with special emphasis on the application of traditional copyright principles to new technologies and media of expression. 3 hours or 1 unit. First-year law students who have taken the Copyright Act section of LAW 310 are not permitted to enroll in this course due to overlapping coverage.

344. Sports Law

Examines specialized aspects of the sports industry; emphasis given to antitrust, labor, and tax issues as applied to professional sports, and antitrust and constitutional issues that have allowed courts to intervene in intercollegiate athletics. Does not consider recurring legal problems for which general principles of law are applicable. 2 or 3 hours, or ½ or 1 unit.

345. Patent Law

Historical development of protection of ideas, inventions, and discoveries; patentability; securing the patent; amendment and correction of patents; and infringement remedies, defenses, and procedures. 2 or 3 hours, or ½ or 1 unit.

346. Sales

Elective for second- and third-year law students is a foundational course for commercial law. Subjects covered include the nature and operation of the Uniform Commercial Code, issues regarding formation and performance of sales contracts, warranty, remedies for breach, documentary transactions and international sales. 3 hours or 1 unit.

347. International Trade Policy

Analysis of the regulation of trade between nations by international agreement (e.g., the GATT), by multinational organizations (e.g., the European Communities), and by individual countries; emphasizes U.S. import restraints, export controls, and related laws. 3 hours or 1 unit.

348. Income Taxation

The fundamental course in federal income taxation. Includes materials relating to income taxation of individuals and an introduction to taxation of corporations and shareholders. 3 or 4 hours, or 1 unit.

349. Corporate Taxation

In-depth study of federal income tax law related to taxation of corporations, shareholders, partnerships, and partners. *Prerequisite:* LAW 348. 3 hours or 1 unit.

350. Partnership Taxation

Involves the study of Subchapter K of the Internal Revenue Code, including partnership formation, allocations, distributions, and liquidations. Also examines the tax treatment of Subchapter S corporations. *Prerequisite:* LAW 348. 3 hours or 1 unit.

351. Estate and Gift Taxation

Comprehensive treatment of federal transfer (estate and gift) taxes. *Prerequisite:* LAW 348. 3 hours or 1 unit.

353. State and Local Taxation

Survey which stresses the constitutional and statutory bases of state and local tax systems; considers the fiscal and economic policy aspects of the tax structure; and includes the power and purposes of taxation, the operation and administration of the general property tax, jurisdiction of the states to impose various types of taxes, and special problems relating to the operation of income, sales, and business excise taxes. 2 or 3 hours, or ½ or 1 unit.

354. Taxation of International Transactions

Survey of the problems in U.S. taxation of foreign persons and foreign income, with special emphasis upon foreign business transactions of U.S. corporations. *Prerequisite:* LAW 351. 3 hours or 1 unit.

356. Comparative Employment Relations Systems

Same as L I R 454. See L I R 454.

357. Labor Law, I

Same as L I R 347. Study of the National Labor Relations Act as amended, the preact history of the labor movement, and the judiciary's response thereto, with emphasis on understanding the problems, experiments, and forces leading to the enactment; includes the negotiation and administration of the collective bargaining agreement, especially the grievance arbitration procedure, its operation and place in national labor policy; and explores the relationship of the individual and the union. *Prerequisite:* Graduate standing or completion of first year of law curriculum. 3 or 4 hours, or 1 unit.

358. Employment Discrimination

Problems arising under federal statutory prohibitions of discrimination in employment, with particular emphasis on evidentiary problems and the use of statistical proofs; defining relevant labor pools, using statistical analyses of data, and establishing proof of test validation. *Prerequisite:* All first year law courses. 2 or 3 hours, or ½ or 1 unit (summer session, 3 hours or 1 unit.).

360. Labor Law and Public Policy

Same as L I R 451. See L I R 451.

361. Workplace Dispute Resolution

Same as ECON and L I R 443. See L I R 443.

362. Public Sector Labor Law

Same as L I R 362. Treats the law of collective bargaining in public, largely state and municipal employment. Explores particular needs of public employment, in contrast with private employment, regarding approaches to: bargaining structure; scope of bargaining and enforceability of agreements; impasse and the resolution of disputes over terms and conditions of employment; and exclusivity of representation. *Prerequisite:* LAW 357. 3 hours or 1 unit.

363. Family Law

The creation and dissolution of the family, and legal relationships established by marriage, cohabitation and procreation. Covers the law of marriage, divorce, annulment, separation, unmarried cohabitation, illegitimacy, adoption and rights of child custody, parental property on divorce, inheritance, and related rights. Legal rules are placed into the social setting in which they operate, and emphasis is given to family policy as reflected in current developments in family law reform, including constitutional law. 3 hours or 1 unit.

364. Decedent's Estates and Trusts

Studies the means of transferring wealth, with primary emphasis on gratuitous transfers; the means available for making gratuitous transfers, including the validity and effect of testamentary instruments and trust deeds; and problems concerning the dispositive provisions of any type of instrument which transfers wealth. 3 hours or 1 unit.

366. Problems in Estate Planning

Selected problems in the planning of estates which will serve to integrate the basic materials in property, trusts, wills, and income, estate, and gift taxation. *Prerequisite:* LAW 348, 351, and 364. 2 to 3 hours, or ½ to 1 unit.

367. Alternative Dispute Resolution

Examination of the limitations, consequences, and costs, as well as the indispensability of some aspects of modern litigation; the possibilities, requirements, and legal problems of consensual and of court-annexed dispute resolution processes alternative to final judicial adjudication, including legal counseling, negotiation, mediation, arbitration, mini-trials, summary trials, summary jury trials, early neutral evaluation, private resolution providers, and settlement processes; current disputes used for illustration. 2 to 3 hours, or ½ to 1 unit.

369. American Legal History

Studies selected topics in the development of law and legal institutions in the United States with particular emphasis on the history of the legal profession, legal education, and the role of lawyers and courts in U.S. society. *Prerequisite:* Some prior study of U.S. history, particularly social and intellectual, is helpful but not required. 3 hours or 1 unit.

370. International Human Rights Law

Studies established and developing legal rules and procedures governing the protection of international human rights, including Marxist and Third World, as well as Western, conceptions of those rights. 3 hours or 1 unit.

371. Jurisprudence

The place of law in society; the nature, goals, and methods of law; and the relation of law and social science. 3 hours or 1 unit.

373. Current Legal Problems

Intensive study of selected current legal problems; based upon recent court decisions, recent legislation, pending law reform proposals, or empirical studies; subject matter varies with each section; multiple sections and topics may be offered in a semester. 1 to 4 hours, or ¼ to 1 unit.

374. International Law

The nature, sources, and subjects of international law and its place in the control of international society; includes an examination of the law of jurisdiction, territory, recognition and succession of states, rights and immunities of states in foreign courts, diplomatic immunities, treaties, protection of citizens abroad, settlement of international disputes, war and neutrality, the United Nations, and the International Court of Justice. 3 hours or 1 unit.

375. Comparative Law

Introduction to legal systems that differ significantly from ours through discussion of specific subjects, including legal education, legal professionals and fees, public law, commercial law, highlights of civil procedure, bases of jurisdiction, the relative roles of cases, statutes, and codes, and international business practices. The two major civil law code systems (French and German) are principal sources with contrasts between English and American common law also noted. 2 hours or ½ unit.

377. Russian Law

Russian conceptions of the role of law in theory and in practice; highlights of Russian law, with comparison to the common law and civil law traditions; and study of Russian court and legislative materials. 2 to 3 hours, or ½ to 1 unit.

378. European Community Law

Intensive study of the European Common Market, particularly of its laws relating to trade barriers, establishment of companies, and antitrust; and United States legislation in the field of international trade. 2 or 3 hours, or ½ or 1 unit.

379. Economic Analysis of Law

Introduction to the systematic economic analysis of law, including property, contracts, torts, criminal law, and related topics. 3 hours or 1 unit.

380. Advanced Torts

Examines a variety of advanced tort topics, such as defamation, privacy, misrepresentation, special duties, prima facie tort, alternative compensation schemes, and proposals for tort reform. 3 hours or 1 unit.

381. Evidence

Law governing the proof of disputed issues of fact; function of the court and jury; competence and examination of witnesses; standards of relevancy; privileged communications; illegal evidence; hearsay rule; best evidence

rule; presumptions; and judicial notice. 3 or 4 hours, or 1 unit.

382. Trial Advocacy

Examination of the problems of advocacy and tactics at the trial level. Students engage in all aspects of actual trial work, including witness preparation, opening and closing statements, direct and cross examination, and jury instructions; culminates in student conduct of a full jury trial in late spring; demonstrations are conducted by staff and visiting judges and practitioners. *Prerequisite:* LAW 381. 2 hours or ½ unit. Full year course; is repeated to a total of 4 hours or 1 unit.

383. Fundamentals of Trial Practice

Explores the theory and reality of trial practice, from developing a theory of the case through submission of jury instructions; topics include fact gathering, jury selection, opening statements, direct and cross-examination, exhibits, expert witnesses, and closing arguments. *Prerequisite:* LAW 381 and concurrent registration in LAW 382. 3 hours or 1 unit.

384. Insurance Law

Covers principles generally applicable to insurance law and includes distinctive rules governing certain types of insurance coverage; objectives are to examine the nature of the insurance contract, marketing of insurance, principles of indemnity, individuals and entities protected by insurance rules, and risks that are shifted by insurance coverage. *Prerequisite:* First-year curriculum. 3 hours or 1 unit.

385. Conflict of Laws

Study of problems having relationship with two or more states or nations involving individual litigants or potential litigants; includes such matters as jurisdiction of courts, judgments, torts, workers' compensation, contracts, property, family relationships, trusts and estates, business organizations, and governmental activities. 3 hours or 1 unit.

386. Federal Courts

Examination of the relationship of federal courts to other organs of federal government and to the states, including an analysis of cases dealing with congressional control over jurisdiction, federal review of state court decisions (including the relationship between state and federal substantive and procedural law), and application of law to fact; the scope of the federal question of jurisdiction in federal courts; abstention; federal injunctions of state criminal proceedings; and problems of justiciability, advisory opinions, and mootness. 3 hours or 1 unit.

387. Products Liability

Substantive theories of products liability: negligence, breach of warranty, strict liability, and tortious misrepresentation; procedural and remedial problems with, and defenses to, each substantive theory. 2 to 3 hours, or ½ to 1 unit.

388. Complex Litigation

Legal and practical issues in "complex" cases: problems of joinder in multiparty cases, consolidation of cases brought independently

(including the activities of the Judicial Panel of Multidistrict Litigation), class actions, discovery issues including the assertion and waiver of evidentiary privileges and use of computers, consequences of active judicial "management" of litigation at the pretrial stage, settlement of complex cases, and res judicata problems. 3 hours or 1 unit.

390. Law of Professional Responsibility

Problem course analyzing ethical issues that arise in the practice of law and considering the approaches to such issues taken by the American Bar Association's Code of Professional Responsibility, Model Rules of Professional Conduct, and Code of Judicial Conduct. 1 to 3 hours, or ½ to 1 unit.

391. Civil Procedure II: Jurisdiction and Forum Choice

Elective for second- and third- year law students introduces issues of jurisdiction and choice-of-law, such as subject matter jurisdiction, removal, Erie doctrine and federal common law. *Prerequisite:* LAW 309. 3 hours or 1 unit.

392. Lawyer as Negotiator

Examines the negotiation process generally engaged in by legal practitioners; discusses specific negotiation situations of concern to lawyers, and considers the impact of social psychology upon the negotiation process. Reading materials include topics such as labor bargaining, personal injury settlements, nonverbal communication, visible manifestation of anxiety, and stress reaction; students engage in mock negotiations and write a paper on a related topic. 2 hours or ½ unit (summer session, 3 hours or 1 unit).

393. Legal Drafting and Law Office Practice

Practical course on the drafting of legal documents; a study of the organization and management of a law office. 2 or 3 hours.

394. Legal Problems

Preparation of comments on current legal developments for publication in the University of Illinois Law Review or the Illinois Bar Journal. 1 to 2 hours. May be repeated for a maximum of four semesters. No graduate credit.

395. Moot Court Board

Preparation of an appellate brief; presentation of an appellate oral argument; participation in intramural, state, national, or international moot court competition. 1 to 2 hours. No graduate credit. May be repeated to a maximum of 4 hours.

396. Remedies

Survey of legal and equitable remedies for the protection of personal and property rights. Procedural and substantive aspects of injunctions; restitution of unjust enrichment in the context of the receipt of unsolicited benefits, benefits derived from the commission of tortious acts, and the mistaken acquisition of benefits; alternative remedies arising from bargain transactions; and remedies for violations of civil rights. 2 or 3 hours, or ½ or 1 unit.

397. Clinical Training

Student field work in the offices of the Land of Lincoln Legal Assistance Foundation in Champaign and Danville, Champaign Human Relations Commission, local City Attorneys, State of Illinois Department of Mental Health, Champaign County State's Attorney, Champaign County Public Defender, Student Legal Service, and other public agencies. Students engage in legal and investigative work under the supervision of agency attorneys or other administrative personnel; this work may include conducting client interviews, doing legal research, preparing legal documents, and in some cases engaging in the trial of actual cases. 1 to 4 hours. No graduate credit.

398. Seminars

Numerous seminars covering a variety of topics are offered each academic year. The common features of seminars are that they typically focus on a more narrow issue than that covered in exam courses, deal with cutting-edge issues, have a low enrollment (usually no more than 12 students), and require a paper, rather than an exam. 2 or 3 hours, or ½ or 1 unit. May be repeated.

399. Research in Special Topics

Individual research on a special problem selected in consultation with the instructor. 0 to 4 hours, or ½ to 1 unit.

402. Introduction to United States Law

Intensive introduction to the American legal system for graduate law students with prior professional training in noncommon law legal systems; stresses the functioning of basic U.S. legal institutions and the techniques of American legal research. 3 hours or 1 unit.

420. Environmental Law and Policy, II

Course will examine closely the major federal statutes that control pollution and protect natural areas, including the Clean Water Act, the Clean Air Act, and the various statutes dealing with hazardous substances. *Prerequisite:* LAW 319. 3 hours or 1 unit.

421. Modern Environmental Theory

Considers the major strands of environmental thought in twentieth-century United States, from the conservation-preservation debate of the Progressive Era through the ethical and ecological debates of the present. 3 hours or 1 unit.

422. Wildlife Law

Covers a variety of legal issues relating to the status and treatment of wildlife and the management of natural areas for the conservation of biodiversity. 3 hours or 1 unit.

423. Toxic Torts

Covers the substantive theories of liability and remedies for environmental torts, focusing on injuries and diseases caused by products such as cigarettes, IUDs and chemicals and by environmental contamination (such as ground-water pollution). *Prerequisite:* LAW 303. 3 hours or 1 unit.

497. Advanced Interdisciplinary Legal Research

For students pursuing an interdisciplinary research project completed under the joint

supervision of a professor from the College of Law and a professor from elsewhere on campus. *Prerequisite:* Consent of the Associate Dean of the College of Law. 2 to 4 hours, or ½ to 1 unit.

498. Pro Bono Service

Course carries no academic credit, but recognizes law students who provide at least sixty hours of pro bono legal service to the community. The sixty hours of service may be performed at any time during the student's three years of law school, and must be documented through reports to the Associate Dean for Academic Affairs. *Prerequisite:* Enrollment in the J.D., LL.M., or M.C.L. programs at the College of Law. 0 credit. Students may enroll only with permission of the Associate Dean for Academic Affairs.

499. Thesis Research

0 to 3 units.

LEISURE STUDIES

Head of Department: William McKinney
Department Office: 104 Huff Hall, 1206 South Fourth Street, Champaign
Phone: 333-4410
URL: www.leisurestudies.uiuc.edu

Leisure Studies (LEIST)

100. Society and Leisure

Central issues in defining leisure; historical, philosophical, sociological, psychological, and economic approaches to understanding leisure behavior, its meanings, social contexts, and personal and social resources. 3 hours.

110. Foundations for Delivery of Leisure Services

Introduces the leisure studies major to the concepts, principles, and practices related to the provision of leisure services; description of the various fields of professional practices and basic elements of leisure service systems such as budgeting, planning, staffing, and characteristics of client populations. 2 hours.

116. Computer Applications in Leisure Services

Stresses the unique applications of computer technologies, systems, and programs for the delivery of leisure services. 2 hours.

130. Leisure Services for Individuals with Disabilities

Survey of the history, philosophy, concepts, and trends in leisure service delivery; overviews types of populations served; describes settings and services; examines leisure service delivery in clinical and community settings. 2 hours.

140. Nature and Wilderness in American Life

Origins of the nature and wilderness preservation movements; philosophy behind nature conservation and outdoor activities; role of parks, outdoor recreation, and nature-tourism in contemporary life. 2 hours.

141. Introduction to Outdoor Recreation

Course is designed to give students a broad overview of the field of outdoor recreation which includes the basis for outdoor recreation, the involvement of governmental agencies, involvement of the private sector, and management of practices. 2 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Leisure Services Programming and Leadership

Provides a basic understanding of theory and practice in recreation program development and leadership in various leisure service settings. Covers fundamental programming models, goals, implementation, and evaluation. Discusses leadership theories and methods applicable to leisure service delivery. *Prerequisite:* LEIST 100 and 110. 4 hours.

210. Human Resource Management in Leisure Organizations

Concepts, principles, and objectives of supervision; the nature of the supervisory relationship; supervisory functions and processes; identification and application of methods and techniques; organizational and operational patterns of supervision in recreation and park settings. 3 hours.

212. Dynamics of Tourism

Survey of travel and tourism with emphasis upon tourist behavior, motivations, preferences, decision-making, attractions, transportation services, facilities and information sources. Examines travel and tourism as an element of leisure service delivery from an interdisciplinary perspective. *Prerequisite:* LEIST 100 or consent of instructor. 3 hours.

214. Introduction to Aging

Same as CHLTH, HDFS, PSYCH, and REHAB 214. See HDFS 214.

218. Recreation Business

In-depth study of the delivery of leisure services in the for-profit sector. Covers the scope and administrative functions of recreation enterprises, including an analysis of planning, controlling, and developing recreation enterprises. *Prerequisite:* LEIST 100 or consent of instructor. 3 hours.

240. Leisure Resources and Facility Management

Basic understanding of park operations, facility design, construction, and maintenance practices; staff allocations, job analysis, contract administration, organizational structures. *Prerequisite:* LEIST 100, and 110. 3 hours.

241. Outdoor Recreation Consortium

Intensive on-site study of programs and management of large multiple-use recreation

areas; includes lectures, problem solving, and interaction with personnel from various responsible agencies. *Prerequisite:* LEIST 141 and 240; L A 226, or consent of instructor. 2 hours. May be repeated to a maximum of 6 hours.

242. Nature and American Culture

Same as LA 216, NRES and HIST 242. Appreciation and critique of cultural meanings associated with American natural landscapes. Traditional perspectives including colonial American, romantic, and science-based conservation are characterized, as well as revisionist themes aligned with gender, cultural pluralism, and societal meanings of parks and protected areas. Implications of diversity in cultural meanings toward nature are developed and provide the basis for assessing tenets of contemporary environmental policy and supporting concepts associated with community-based conservation. 3 hours.

250. Special Problems

Special projects in research and independent investigation in any phase of health, physical education, recreation, or related areas selected by the student. *Prerequisite:* Junior or senior standing; grade-point average of 2.5; consent of faculty adviser, instructor, and head of department. 2 to 3 hours. May be repeated to a maximum of 4 to 6 hours.

252. Introduction to Sport Management

Examines career opportunities within the sport industry and provides knowledge relevant to the management, marketing, legal, and financial operations of sport organizations. Incorporates applications in a variety of sport entities including intercollegiate athletics, campus recreation, event and facility management, professional sport, management and marketing agencies, and international sport. *Prerequisite:* LEIST 100 and 110 or consent of instructor. 3 hours.

260. Honors Seminar

Same as CHLTH and KINES 290. See KINES 290.

280. Orientation to Practicum

Prepares and places students in the Leisure Studies Practicum. Students must document completion of 320 hours of field work. Topics include placement requirements and policies, vitas, interviewing, letters of application, and the role and issues of professional practice. *Prerequisite:* Junior standing; LEIST 100, 110, 130, and either 200 or 230. 0 hours.

284. Leisure Studies Practicum

Students are assigned to University-approved field training stations in an internship capacity for a minimum of forty hours per week for sixteen weeks. Both the agency and the University provide supervision. *Prerequisite:* Senior standing; LEIST 280 and 310. 6 or 12 hours. Must be repeated to a maximum of 12 hours credit.

290. Research in Leisure Studies

First of a two-course sequence examining elementary principles of research methods, design, processing and analysis; use of completed leisure research; development of an ability to conduct, evaluate, and utilize

research on leisure behavior. *Prerequisite:* Junior standing; LEIST 100, or consent of instructor. 3 hours.

291. Research Applications in Leisure Studies

Second of a two-course sequence introducing students to the principles of research methods and their application to leisure systems. Focuses on techniques of data collection, instrument design, measurement, and data analysis and interpretation applied to leisure service delivery systems. *Prerequisite:* LEIST 290 or equivalent, or consent of instructor. 3 hours.

299. Off-Campus Study

Provides campus credit for foreign or domestic study completed off-campus. A student's proposal for study must have prior approval of the major department and the college office. Final determination of appropriate credit is made on the student's completion of the work. *Prerequisite:* Advanced standing and approval of major department and college. 0 to 16 hours (summer session, 0 to 8 hours). May be repeated to a maximum of 32 hours.

310. Administration of Leisure Services

Development of overall leisure management function. Analysis of administration and policies such as organizational structure, executive leadership, decision-making, financing, and public relations. *Prerequisite:* Undergraduates: Completion of campus Composition I general education requirement and upper level standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

316. Leisure and Human Development

Examines changes in expressive style and behavior over the life course, and the interaction of leisure with developmental processes. *Prerequisite:* LEIST 100 and one introductory psychology or human development course; or consent of instructor. 3 hours or 1 unit.

320. Leisure Services Marketing

Application of marketing concepts to the delivery of leisure services. Introduces consumer decision theory analysis. Provides an integrative study of the methods and models for developing and evaluating alternative marketing strategies. *Prerequisite:* BADM 202. 3 hours or 1 unit.

329. Contemporary Issues in Leisure Services

Discusses economic, socio-demographic, and political issues related to leisure service management. Serves as a capstone course for students preparing to graduate. *Prerequisite:* LEIST 201 and 210, and senior standing; or consent of instructor. 3 hours or 1 unit.

332. Program Design and Evaluation in Leisure

Examines theory and techniques of leisure services program design and evaluation utilizing system approaches; includes needs assessment, agency accountability, and comprehensive programming strategies. *Prerequisite:* LEIST 201 or consent of instructor. 3 hours or 1 unit.

340. Outdoor Recreation Management

Principles, practices, and problems involved in managing outdoor recreation areas; emphasizes management of both natural and cultural resources and visitor use patterns. *Prerequisite:* L A 226 and LEIST 141; or consent of instructor. LEIST 290 or another research methods course recommended. 3 hours, or $\frac{1}{2}$ or 1 unit.

341. Outdoor Recreation Resource Planning

Studies the outdoor recreational use of lands in the public domain and their planning, concepts, and processes related to planning resource based systems; multiple-use in planning; planning criteria for outdoor recreation facilities. *Prerequisite:* LEIST 141, L A 226, and junior standing; or consent of instructor. 3 hours, or $\frac{1}{2}$ or 1 unit.

344. Social Impact Assessment

Same as ENVST, L A, NRES, R SOC, and U P 344. Provides the student with a theoretical understanding and the methodology to conduct social impact assessment and social soundness analysis within the context of planned change as a component of environmental impact assessment and development projects within both First and Third World countries. *Prerequisite:* R SOC 110 or SOC 100 or equivalent introductory social science course. For Urban and Regional Planning students only: U P 101, 240, and 247. 3 hours, or $\frac{3}{4}$ or 1 unit.

381. Management Internship

Work-study experience in the management aspects of leisure service delivery systems. Students are assigned to agencies in their special fields of study and are closely supervised by University faculty. *Prerequisite:* LEIST 284 or graduate standing. 2 to 4 hours, or $\frac{1}{2}$ to 1 unit.

401. Foundations of Leisure Studies

Basic philosophical, historical, and scientific foundations and developments in leisure and recreation; analyses of the significance of leisure in modern societies; critical review of major writings in the field with attention to particular special problem areas and current issues. *Prerequisite:* LEIST 100 or equivalent. 1 unit.

402. Leisure Systems Administration

In-depth study of the public administrative functions in large complex organizational structures; development of an understanding of change and evolution in leisure service agencies as related to the internal and external environments; study of various management styles and situations in leisure service agencies. *Prerequisite:* Basic course in administration or organization of leisure service agencies. 1 unit.

403. Advanced Research Methods in Leisure

Examines methods and techniques of conducting and evaluating leisure research; experimental and survey designs and procedures; data collection, reduction and analysis. *Prerequisite:* LEIST 100 or equivalent; LEIST 290 or equivalent; a course in introductory statistics. 1 unit.

412. Personnel Administration for the Delivery of Leisure Services

Examines theoretical and technical principles of personnel managers in leisure service agencies; recruitment, training, selection, and evaluation of personnel with special emphasis on applied measurement concepts and legislation related to personnel administration in leisure services. *Prerequisite:* LEIST 310 or consent of instructor. 1 unit.

440. Public Involvement in Resource Management and Environmental Planning

Same as ENVST, L A, NRES, R SOC, and U P 440. See NRES 440.

445. Sociology of Leisure

Same as SOC 445. Sociological theory and research methods as applied to the study of leisure; institutional and community contexts of leisure, leisure roles and socialization, built and natural environments, and the relationship of leisure to family, work, subcultures, and resources. *Prerequisite:* LEIST 401 or SOC 386 or 415, or consent of instructor. 1 unit.

465. Psychology of Leisure

Applies psychological theory and research methods to the study of leisure behavior and experience including a consideration of basic motivation, individual differences, and social interaction and implications for developmental intervention and human services. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

475. Leisure and Culture

Same as ANTH and KINES 475. Application of anthropological approaches and methods to the study of leisure and expressive behavior. Course topics include the evolutionary foundations for leisure and culture, adaptation, race, and class; the cross-cultural correlates of leisure and applied anthropology. *Prerequisite:* LEIST 401 or equivalent and an introductory course in anthropology, or consent of instructor. 1 unit.

490. Seminar

Student presentation of thesis studies, informal discussions, and critical analysis of problems; informal lectures by invited speakers. 0 credit.

493. Special Problems

Independent research on special projects. Open only to students majoring in leisure studies. $\frac{1}{2}$ to 2 units.

494. Special Topics in Leisure Studies

Lecture courses in topics of current interest; specific subject matter will be announced in the *Timetable*. *Prerequisite:* Will be determined for each course offered and will be indicated in the *Timetable*. $\frac{1}{2}$ or 1 unit.

499. Thesis Research

Preparation of thesis in leisure studies. 0 to 4 units.

LIBERAL ARTS AND SCIENCES

Office: Liberal Arts and Sciences
Address: 294 Lincoln Hall, 702 South Wright Street, Urbana
Phone: 333-1705
URL: kingbird.las.uiuc.edu/las

Liberal Arts and Sciences (L A S)

100. Learning Community

Special discussion groups for freshman members of L A S Learning Communities to enable them to discuss topics related to their enrollment in paired courses, their academic and social adjustments, and the mentoring provided by their assigned junior-senior Learning Leader. 0 hours. May be repeated in separate semesters.

110. Workshop-Tutorial

Independent study and experimental seminars open to Unit One students and to others; specific offerings vary each semester. *Prerequisite:* Unit One students or consent of Unit One Director. 0 to 4 hours. Credit toward college or departmental requirements is contingent upon approval by the appropriate unit. A total of 12 hours of L A S 110 credit may be applied toward graduation in the College of Liberal Arts and Sciences.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

294. Senior Project

For students seeking graduation with distinction in IPS. *Prerequisite:* Consent of instructor and IPS Advisory Committee; open only to students whose major is IPS and who have a cumulative GPA of at least 3.25. 2 or 4 hours. May be repeated to a maximum of 4 hours.

295. Interdisciplinary Honors Seminar

Seminar on interdisciplinary topics in the natural sciences, social sciences, humanities, and arts. *Prerequisite:* Consent of instructor. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

298. Study Abroad Predeparture Orientation

Eight-week course designed for students planning to study abroad. Examines the effects of different cultural orientations upon interaction and adjustment; explores the issues surrounding the experience of entering, interacting within, and returning from a foreign culture; increases awareness of verbal, nonverbal, and cultural factors affecting information processing. Course combines the theoretical with a strong experiential component and hands-on training. Essential for any country of destination and length of sojourn. *Prerequisite:* Study Abroad Office approval. 1 hour.

299. L A S Study Abroad

Provides credit toward the undergraduate degree for study at accredited foreign institutions or approved overseas programs. Final determination of credit is made upon the student's completion of the work. *Prerequisite:* One year of residence at UIUC, good academic standing, and prior approval of the major department and the College of Liberal Arts and Sciences. 0 to 18 hours (summer session, 0 to 8 hours). May be repeated to a maximum of 36 semester hours per academic year or to a total of 44 semester hours, all of which must be earned within one calendar year.

392. Ford Seminar: Conceptual Foundations

Same as F A A 392. See F A A 392.

393. Ford Seminar: Research and Arts Practicum

Same as F A A 393. See F A A 393.

394. Ford Seminar: Fieldwork Abroad

Same as F A A 394. See F A A 394.

492. Ford Seminar: Advanced Conceptual Foundations

Same as F A A 492. See F A A 492.

493. Ford Seminar: Advanced Research and Arts Practicum

Same as F A A 493. See F A A 493.

494. Ford Seminar: Advanced Research and Arts Practicum

Same as F A A 494. See F A A 494.

LIBRARY AND INFORMATION SCIENCE

Dean of Graduate School of Library and Information Science: Leigh Estabrook
School Office: 112A Library and Information Science Building, 501 East Daniel Street, Champaign
Phone: 333-3280
URL: alexia.lis.uiuc.edu

Library and Information Science (LIS)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Information, Technology and Organizations

Same as COMM 201. Explores the way in which organizations collect, process, and exchange information, the technologies they use to handle information, and the organizational, technological and societal factors that affect information processing goals. 3 hours.

202. Social Aspects of Information Systems

Same as COMM 202. Explores the way in which information technologies have and are transforming society and how these affect a

range of social, political and economic issues from the individual to societal levels. 3 hours.

250. Special Topics in Information Science
Directed and supervised investigation of selected topics in information studies that may include among others computers and culture; information policy; community information systems; production, retrieval and evaluation of scientific or social science knowledge; computer-mediated communication; and computer-supported cooperative work. *Prerequisite:* Sophomore standing. 1 to 3 hours. May be repeated in same or separate semesters as topics vary to a maximum of 12 hours.

301. Bibliography

Covers enumerative bibliography, the practices of compiling lists; analytical bibliography, the design, production, and handling of books as physical objects; and historical bibliography, the history of books and other library materials, from the invention of printing to the present. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

303. Library Materials for Children

Selection and use of library materials for children in public libraries and elementary school media centers according to their needs in their physical, mental, social, and emotional development; deals with the standard selection aids for all types of print and nonprint materials and develops the ability to select and describe children's materials according to their developmental uses. *Prerequisite:* Junior standing, or consent of instructor. 3 hours, or ½ or 1 unit.

304. Library Materials for Young Adults

Evaluation, selection, and use of library materials for young adults in school and public libraries and community organizations according to personal and curricular needs; studies selection sources for all formats of materials and explores techniques for utilization of materials. *Prerequisite:* Junior standing, or consent of instructor. 3 hours, or ½ or 1 unit.

309. Storytelling

Fundamental principles of the art of storytelling including techniques of adaptation and presentation; content and sources of materials; story cycles; methods of learning; practice in storytelling; and planning the story hour for school and public libraries, recreational centers, the radio, and television. *Prerequisite:* Junior standing and consent of instructor. 3 hours, or ½ or 1 unit.

315. Introduction to Network Information Systems

Hands-on introduction to technology systems for use in information environments. The course steps students through choosing, installing, and managing computer hardware and operating systems, as well as networking hardware and software. Students will have an opportunity to design and create a working network environment as part of the course work. 4 hours or 1 unit.

316. Instruction and Assistance Systems

Provides an introduction to instruction and assistance methods used in a variety of information systems including libraries, archives,

museums, and electronic environments. Includes an overview of theoretical and applied research and discusses relevant issues and concepts. Students will have an opportunity to design and present an instruction or assistance program. *3 hours or 1 unit.*

317. Foundations of Data Processing in Library and Information Science

Covers the common data processing constructs and programming concepts used in library and information science. The history, strengths and weaknesses of the techniques are evaluated in the context of our discipline. These constructs and techniques form the basis of applications in areas such as bibliographic records management, full text management and multimedia. *4 hours or ½ or 1 unit.*

329. Information Storage and Retrieval

Introduces problems of document representation, information need specification, and query processing. Describes the theories, models, and current research aimed at solving those problems. Primary focus is on bibliographic, text, and multimedia records. *3 hours or 1 unit.*

350. Advanced Special Topics in Information Studies

Directed and supervised investigation of selected topics in information studies that may include among others the social, political, and historical contexts of information creation and dissemination; computers and culture; information policy; community information systems; production, retrieval and evaluation of knowledge; computer-mediated communication. *Prerequisite:* Junior standing and LIS 201 or 202, or consent of instructor. *1 to 4 hours, or ½ to 1 unit.* May be repeated in the same or separate semesters as topics vary to a maximum of 12 hours or 2 units.

353. Using Networked Information Systems

Issues and tools for remote technology-based communication and information systems. Current and historical trends in methods for electronic information dissemination and communication, and their impact on society, organizations and individuals are discussed. Topics include systems, issues and changes in: interpersonal, group, and mass communication; publishing; information access; education; and other areas. Hands-on use and evaluation of currently available network-based communication and retrieval systems. *Prerequisite:* LIS 370 or consent of instructor. *4 hours or 1 unit.*

360. Practicum

Supervised field experience of professional-level duties in an approved library or information center. *Prerequisite:* Completion of 3 ½ units of library and information science courses; junior standing or consent of instructor. *3 hours or ½ unit.* A maximum of ½ unit may be applied toward a degree program.

370. Systems Analysis and Management

Covers how to evaluate, select and manage information systems that will be used in the daily operation of libraries and information

centers. Includes the systems used by technical staff and the information consumers. Course will focus on information as a product. Attention is given to the operation of an organization as a whole and the impact of change on the integration of resources, work flow and usability. Formal methods for modeling systems, and industry practice techniques of analysis are used to address these problems and opportunities. *3 hours or 1 unit.*

380. Information Organization and Access

Emphasizes information organization and access in settings and systems of different kinds. Traces the information transfer process, from the generation of knowledge through its storage and use in both print and nonprint formats. Consideration will be given to the creation of information systems: the principles and practice of selection and preservation, methods of organizing information for retrieval and display, the operation of organizations that provide information services, and the information service needs of various user communities. *3 hours or 1 unit.* Required core course.

390. Libraries, Information, and Society

Explores major issues in the library and information science professions as they involve their communities of users and sponsors. Analyzes specific situations that reflect the professional agenda of these fields, including intellectual freedom, community service, professional ethics, social responsibilities, intellectual property, literacy, historical and international models, the socio-cultural role of libraries and information agencies and professionalism in general, focusing in particular on the interrelationships among these issues. *2 hours or ½ unit.*

391. Literacy in the Information Age

Same as COMM 391. A capstone course that draws on students' experience throughout their undergraduate program to discuss a series of themes such as community, the political sphere and education which have been impacted by the new information technologies. *Prerequisite:* LIS 201 or 202. *3 hours or 1 unit.*

404. Reference Sources and Services

Explores reference services in all types of libraries; provides a comprehensive examination of widely used print and on-line sources, and develops question negotiation skills and search strategies. *1 unit.*

405. Library Administration

Designed to supply knowledge of the internal organization of libraries and of the principles of library administration; emphasis on comparison of the conditions found in the several kinds of libraries and on applications of the general theory of administration. *1 unit.*

406. Media Programs and Service for Children and Young Adults

The role, problems, and needs of children's and young adults' library services in the school and public library. *1 unit.*

407. Cataloging and Classification, I

Theory and application of basic principles and concepts of descriptive and subject cataloging; emphasis on interpreting catalog entries and making a catalog responsive to the needs of users; provides beginning-level experience with choice of entries, construction of headings, description of monographs (and, to a lesser extent, of serial publications and nonprint media), filing codes, Dewey and Library of Congress classification systems, and Library of Congress subject headings. *1 unit.*

408. Cataloging and Classification, II

More complex problems in making and evaluating the changing, modern library catalog; practical and administrative problems in cataloging serial publications, analytics, ephemeral materials, and microforms; deals with various nonprint media, rare books and manuscripts, foreign language materials, and materials in special subject areas. *Prerequisite:* LIS 407 or consent of instructor. *1 unit.*

410. Adult Public Services

The literature, history, and problems of providing library service to the general adult user; investigation of user characteristics and needs, and the effectiveness of various types of adult services. *1 unit.*

412. Reference Services in the Sciences

Detailed consideration of the bibliographical and reference materials in science, technology, and related disciplines; a survey of the research and communications methods characteristic of these disciplines; and advanced training in solving associated reference problems. *Prerequisite:* LIS 404 or consent of instructor. *½ or 1 unit.*

413. Reference Services in the Social Sciences

Detailed consideration of the bibliographical and reference materials in the social sciences and related disciplines; a survey of the research and communications methods characteristic of these disciplines; and advanced training in solving associated reference problems. *Prerequisite:* LIS 404 or consent of instructor. *½ or 1 unit.*

414. Reference Services in the Arts and Humanities

Detailed consideration of the bibliographical and reference materials in the fine arts and humanities and related disciplines; a survey of the research and communications methods characteristic of these disciplines; and advanced training in solving associated reference problems. *Prerequisite:* LIS 404 or consent of instructor. *½ or 1 unit.*

415. Library Automation

Introduction to various types of equipment for handling information and providing services in libraries; study of applications to library operations; and introduction to systems planning, automation concepts, and computer use. *1 unit.*

416. Advanced Library Automation

The development of computer programs for library processes such as circulation, acquisitions, cataloging, and document retrieval. In-

cludes seminar presentations based on individual research in automation topics. $\frac{1}{2}$ or 1 unit.

424. Government Publications

Aims to acquaint students with government publications, their variety, interest, value, acquisition, and bibliographic control, and to develop proficiency in their reference and research use; considers publications of all types and all governments (local, national, international) with special emphasis on U.S., state and federal governments, and on the United Nations and its related specialized agencies. *Prerequisite:* LIS 404, or consent of instructor. 1 unit.

427. Resources of American Research Libraries

Acquaints students with the distribution and extent of American library resources for advanced study and research; spatial and financial aspects of library resources; methods of surveying library facilities; growth and use of union catalogs and bibliographical centers; interinstitutional agreements for specialization of collections and other forms of library cooperation; and the use of the research collection by the scientist and scholar. $\frac{1}{2}$ or 1 unit.

428. Library Buildings

Studies the library's physical plant in the light of changing concepts and patterns of library service; analyzes present-day library buildings (both new and remodeled), and their comparison with each other as well as with buildings of the past; examines the interrelationship of staff, collections, users, and physical plant; discussion supplemented by visits to new libraries and conference with their staffs. A two-day field trip is required. *Prerequisite:* LIS 405 or consent of instructor. $\frac{1}{2}$ or 1 unit.

429. Implementation of Information Storage and Retrieval

Types of systems for storage and retrieval of documents and references; their characteristics, evaluation, factors affecting their performance, and the mathematical models on which their operations are based are covered. Primary focus is on modern computer-based systems and their implementation. Students will use programming tools to build demonstration systems and install retrieval packages as part of a case study. *Prerequisite:* LIS 317 or proficiency in any programming language and consent of instructor; LIS 370. 1 unit. Concurrent or prior registration in LIS 329 is recommended.

431. Online Information Systems

Explores the state-of-the-art in online information systems, with particular emphasis on their use as part of reference service in libraries; acquaints students with the characteristics of both bibliographic and nonbibliographic databases; and trains students in the use of at least one currently available online retrieval system. *Prerequisite:* LIS 404 or consent of instructor. $\frac{1}{2}$ or 1 unit.

432. History of Libraries

Same as COMM 432. The origins, development, and evolution of libraries and related

institutions, from antiquity to the twentieth century, as a reflection of literacy, recognition of archival responsibility, humanistic achievement, scientific information needs, and service to society. $\frac{1}{2}$ or 1 unit.

433. Information Needs of Particular Communities

In-depth study of the characteristics and information needs of specialist users of libraries; goals and objectives, policies, and services; reference and bibliographical aids; and effective services that satisfy these special needs. *Prerequisite:* LIS 412, 413, or 414, or consent of instructor. $\frac{1}{2}$ to 1 unit. May be repeated for a total of 2 units.

434. Library Systems and Networks

Development of library systems, with special reference to public libraries as a norm for the development of library services; detailed treatment of library standards, the growth and development of county and regional libraries, and the role of the state library and of federal legislation. *Prerequisite:* LIS 405 or consent of instructor. 1 unit.

436. Use and Users of Information

Explores information needs and uses at a general level, addressing formal and informal information channels, barriers to information, issues of value, and impacts of technology. Examines information seeking practices of particular communities and within various environments, introducing recent approaches to user-centered system design and digital library development. Provides an overview of methods that can be used to study information needs, information seeking behavior, and related phenomena. *Prerequisite:* LIS 380. 1 unit.

437. Technical Services Functions

Seminar on the principles, problems, trends, and issues of acquiring, identifying, recording, and conserving/preserving materials in all types of libraries and information centers; includes the special problems of serials management; emphasizes service aspects. *Prerequisite:* LIS 407, or consent of instructor; concurrent registration in LIS 407 is acceptable with consent of instructor. 1 unit.

438. Administration and Use of Archival Materials

Administration of archives and historical manuscripts; emphasizes the processing and research use of archival materials. *Prerequisite:* Consent of instructor. 1 unit.

441. History of Children's Literature

Interpretation of children's literature from the earliest times, including the impact of changing social and cultural patterns on books for children; attention to early printers and publishers of children's books and to magazines for children. 1 unit.

443. Contemporary Book Publishing

Surveys twentieth-century book publishing, placing it in an economic, social, and literary context; emphasizes economic structure, the relationship of author and publisher, promotion, distribution, and the influence of the industry on librarianship. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ or 1 unit.

444. Measurement and Evaluation of Library Services

Methods and criteria for evaluating various facets of library service, including the collection, the catalog, document delivery capabilities, reference service, technical processes, and information retrieval operations; deals with cost-effectiveness considerations. *Prerequisite:* Consent of instructor. 1 unit.

447. Preservation of Library Materials

Covers the broad range of library preservation and conservation for book and nonbook materials relating these efforts to the total library environment; emphasizes how the preservation of collections affects collection management and development, technical services, access to materials and service to users. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ or 1 unit.

449. Economics of Information

The various definitions of information in economic and social terms as discussed in library and information science as well as other literatures are related to government public policies and social policies. Issues such as information as a commodity and as a public good are explored. The impact of the economics of information and related public policies on libraries and information centers is discussed from a national and international perspective. 1 unit.

450. Advanced Problems in Librarianship

Directed and supervised investigation of selected problems in library resources, reference service, research libraries, reading, public libraries, or school libraries. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 2 units.

451. Independent Study

Permits the intermediate or advanced student opportunity to undertake the study of a topic not otherwise offered in the curriculum or to pursue a topic beyond or in greater depth than is possible within the context of a regular course. *Prerequisite:* Consent of dean. $\frac{1}{2}$ to 1 unit. May be repeated by M.S. students to a maximum of 1 unit; CAS students, 2 units; or Ph.D. students, 4 units.

459. CAS Project

Individual study of a problem in library or information science; forms the culmination of the Certificate of Advanced Study program. *Prerequisite:* Admission to Certificate of Advanced Study program in library and information science. 0 to 2 units. May be taken for additional units, but only two will apply to the Certificate of Advanced Study.

475. Seminar in Library and Information Science

Preparation, presentation, and criticism of a scholarly paper of moderate length and publishable quality based on individual study. *Prerequisite:* LIS 471, 472, 473, or 474; open to doctoral students only. 1 unit. Required: To be repeated for a total of 4 units.

490. Proseminar in Library and Information Science

Introduction to theory and research in library and information science for doctoral students.

Course includes presentation and discussion of current research papers of faculty and students. Students also read and discuss core literature in the field. *Prerequisite:* Admission to Library and Information Science doctoral program. $\frac{1}{2}$ to 1 unit. May be repeated in subsequent semesters to a maximum of 2 units. Students enrolled for 1 unit are required to participate in "Readings" section of proseminar.

499. Thesis Research

Individual study and research. *Section A: M.S. candidates, 0 to 2 units. Section B: doctoral candidates, 0 to 4 units.*

LINGUISTICS

Head of Department: Chin W. Kim
Department Office: 4088 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 244-3061
URL: www.linguistics.uiuc.edu

Including African Languages (AFLNG), Arabic (ARAB), Hebrew (HEBR), Hindi (HINDI) Linguistics (LING), Persian (PERS), and Sanskrit (SANSK)

Other languages may be offered by tutorial (see LING 304). See also APPENDIX A for a list of all languages currently offered on this campus.

African Languages (AFLNG)

201. Elementary Bamana, I

Same as AFRST 201. Introduction to Bamana (Bambara), a West African language spoken from Mauritania to Benin; emphasis on grammar, pronunciation, reading and conversation in standard Bamana. Participation in the language laboratory required. 5 hours.

202. Elementary Bamana, II

Same as AFRST 202. Continuation of AFLNG 201, with introduction of more advanced grammar; emphasis on more fluency in speaking, reading, and writing simple sentences in standard Bamana. Participation in the language laboratory required. *Prerequisite:* AFLNG 201. 5 hours.

211. Elementary Lingala, I

Same as AFRST 211. Introduction to Lingala; emphasizes grammar, pronunciation, reading and conversation in standard Lingala. Participation in language laboratory required. 5 hours.

212. Elementary Lingala, II

Same as AFRST 212. Continuation of elementary Lingala, with introduction of more advanced grammar; emphasizes more fluency in speaking, reading, and writing simple sentences in standard Lingala. *Prerequisite:* AFLNG 211. 5 hours. Participation in language laboratory required.

231. Elementary Swahili, I

Same as AFRST 231. Beginning standard Swahili; emphasizes grammar, pronunciation, reading and conversation in standard Swahili. 5 hours. Participation in language laboratory required.

232. Elementary Swahili, II

Same as AFRST 232. Continuation of elementary Swahili, with introduction of more advanced grammar; emphasizes more fluency in speaking, reading, and writing simple sentences in standard Swahili. *Prerequisite:* AFLNG 231. 5 hours. Participation in language laboratory required.

241. Elementary Wolof, I

Same as AFRST 241. Introduction to Wolof; emphasizes grammar, pronunciation, reading, and conversation in standard Wolof. 5 hours. Participation in language laboratory required.

242. Elementary Wolof, II

Same as AFRST 242. Continuation of elementary Wolof, with introduction of more advanced grammar; emphasizes more fluency in speaking, reading, and writing simple sentences in standard Wolof. *Prerequisite:* AFLNG 241. 5 hours. Participation in language laboratory required.

251. Elementary Zulu, I

Same as AFRST 251. Introduction to Zulu; emphasis on grammar, pronunciation, reading and conversation in standard Zulu. 5 hours. Participation in the language laboratory is required.

252. Elementary Zulu, II

Same as AFRST 252. Continuation of AFLNG 251 with introduction of more advanced grammar; emphasis on more fluency in speaking, reading, and writing simple sentences in standard Zulu. *Prerequisite:* AFLNG 251. 5 hours. Participation in the language laboratory required.

303. Intermediate Bamana, I

Same as AFRST 303. Survey of more advanced grammar, with emphasis on increasing conversational fluency, compositional skills, study of written texts in standard Bamana, and discussion of grammatical variations. *Prerequisite:* AFLNG 202. 5 hours or 1 unit. Participation in the language laboratory required.

304. Intermediate Bamana, II

Same as AFRST 304. Continuation of AFLNG 303; emphasis on ability to engage in reasonably fluent discourse in Bamana and comprehensive knowledge of formal grammar, and ability to read ordinary texts in standard Bamana. *Prerequisite:* AFLNG 303. 5 hours or 1 unit. Participation in the language laboratory required.

313. Intermediate Lingala, I

Same as AFRST 313. Survey of more advanced grammar, with emphasis on increasing conversational fluency, composition skills, study of written texts in the standard and spoken Lingala dialects, and discussion of grammatical variations. *Prerequisite:* AFLNG 212. 5 hours or 1 unit. Participation in language laboratory required.

314. Intermediate Lingala, II

Same as AFRST 314. Continuation of AFLNG 313. Emphasizes ability to engage in reasonably fluent discourse in Lingala, comprehensive knowledge of formal grammar, and ability to read ordinary texts in various Lingala dialects. *Prerequisite:* AFLNG 313. 5 hours or 1 unit. Participation in language laboratory required.

315. Advanced Lingala, I

Same as AFRST 315. Third year Lingala with emphasis on conversational fluency and on increased ability in reading and comprehending texts, including newspaper prose and Central African cultural materials, in at least two Lingala varieties. Course will also deal with the advanced level grammar found in such texts. *Prerequisite:* AFLNG 314 or equivalent. 3 hours or $\frac{3}{4}$ unit.

316. Advanced Lingala, II

Same as AFRST 316. Continuation of AFLNG 315 with increased emphasis on conversational fluency and comprehension of advanced level grammar in the reading of a variety of prose texts on current cultural issues. *Prerequisite:* AFLNG 315 or equivalent. 3 hours or $\frac{3}{4}$ unit.

317. Topics in Lingala Language and Literature, I

Same as AFRST 317. Selected readings from modern Lingala authors and composers, with a focus on novels, plays, music, and basic poetry illustrative of Central African cultural issues and advanced level Lingala grammar, as well as development of expository writing skills. *Prerequisite:* AFLNG 316. 3 hours or $\frac{3}{4}$ unit.

318. Topics in Lingala Language and Literature, II

Same as AFRST 318. Continuation of AFLNG 317 with increased emphasis on the reading and comprehension of literary texts exemplified in advanced level novels, plays, and poetry, as well as on advanced mastery of expository writing skills. *Prerequisite:* AFLNG 317. 3 hours or $\frac{3}{4}$ unit.

333. Intermediate Swahili, I

Same as AFRST 333. Second-year Swahili with emphasis on developing conversational fluency; some readings on Swahili culture and customs. *Prerequisite:* One year of Swahili. 5 hours or 1 unit.

334. Intermediate Swahili, II

Same as AFRST 334. More of second-year Swahili with emphasis on conversational fluency; some reading in Swahili literature. *Prerequisite:* One year of Swahili. 5 hours or 1 unit.

335. Advanced Swahili, I

Same as AFRST 335. Third-year Swahili with emphasis on conversational fluency and on increased facility in reading Swahili texts, including current newspaper prose and (East) African culture materials. *Prerequisite:* AFLNG 334 or equivalent. 3 hours or $\frac{3}{4}$ unit.

336. Advanced Swahili, II

Same as AFRST 336. Third-year Swahili with emphasis on conversational fluency and on

increased facility in reading Swahili texts, including current newspaper prose and (East) African culture materials. *Prerequisite:* AFLNG 335 or equivalent. 3 hours or $\frac{3}{4}$ unit.

337. Topics in Kiswahili Language and Literature, I

Same as AFRST 337. Selected readings from modern Kiswahili authors, with a focus on novels, plays, and basic poetry illustrative of East African cultural issues and advanced level Kiswahili grammar, as well as development of expository writing skills. *Prerequisite:* AFLNG 336. 3 hours or $\frac{3}{4}$ unit.

338. Topics in Kiswahili Language and Literature, II

Same as AFRST 338. Continuation of AFLNG 337 with increased emphasis on the reading and comprehension of literary texts exemplified in advanced level novels, plays, and poetry, as well as on advanced mastery of expository writing skills. *Prerequisite:* AFLNG 337. 3 hours or $\frac{3}{4}$ unit.

339. Advanced Topics in Kiswahili Language and Literature, I

Same as AFRST 339. Introduction to Kiswahili in the professions as documented in selected newspapers, educational radio and TV programs, works of fiction, biographies, anthologies, and professional journals. Students will be introduced to argumentative writing in Kiswahili, expected to make oral presentations, and to write a research paper in their field. *Prerequisite:* AFLNG 338. 3 hours or 1 unit.

340. Advanced Topics in Kiswahili Language and Literature, II

Same as AFRST 340. Continuation of AFLNG 339 with increased emphasis on the development of comprehension and writing of professional language. *Prerequisite:* AFLNG 339. 3 hours or 1 unit.

343. Intermediate Wolof, I

Same as AFRST 343. Survey of more advanced grammar, with emphasis on increasing conversational fluency, composition skills, study of written texts in standard and Dakar Wolof, and discussion of grammatical variations. *Prerequisite:* AFLNG 242. 5 hours or 1 unit. Participation in language laboratory required.

344. Intermediate Wolof, II

Same as AFRST 344. Continuation of AFLNG 343. Emphasizes ability to engage in reasonably fluent discourse in Wolof, comprehensive knowledge of formal grammar, and ability to read ordinary texts in standard and Dakar Wolof. *Prerequisite:* AFLNG 343. Participation in language laboratory required.

345. Advanced Wolof, I

Same as AFRST 345. Third year Wolof with emphasis on conversational fluency and on increased ability in reading and comprehending texts, including newspaper prose and West African cultural materials. Course will also deal with the advanced level grammar found in such texts. *Prerequisite:* AFLNG 344 or equivalent. 3 hours or $\frac{3}{4}$ unit.

346. Advanced Wolof, II

Same as AFRST 346. Continuation of AFLNG 345 with increased emphasis on conversational fluency and comprehension of advanced level grammar in the reading of a variety of prose texts on current cultural issues. *Prerequisite:* AFLNG 345 or equivalent. 3 hours or $\frac{3}{4}$ unit.

347. Topics in Wolof Language and Literature, I

Same as AFRST 347. Selected readings from modern Wolof authors, with a focus on novels, plays, and basic poetry illustrative of West African cultural issues and advanced level Wolof grammar, as well as development of expository writing skills. *Prerequisite:* AFLNG 346. 3 hours or $\frac{3}{4}$ unit.

348. Topics in Wolof Language and Literature, II

Same as AFRST 348. Continuation of AFLNG 347 with increased emphasis on the reading and comprehension of literary texts exemplified in advanced level novels, plays, and poetry, as well as on advanced mastery of expository writing skills. *Prerequisite:* AFLNG 347. 3 hours or $\frac{3}{4}$ unit.

351. Intermediate Zulu, I

Same as AFRST 351. Survey of more advanced grammar; emphasis on increasing conversational fluency, composition skills, study of written texts in standard Zulu and discussions of grammatical variations. *Prerequisite:* AFLNG 252. 5 hours or 1 unit. Participation in the language laboratory required.

352. Intermediate Zulu, II

Same as AFRST 352. Continuation of AFLNG 351; emphasis on increasing conversational fluency, composition skills, study of written texts in the standard and spoken Zulu dialects, and discussion of grammatical variations. *Prerequisite:* AFLNG 351. 5 hours or 1 unit. Participation in language laboratory required.

Arabic (ARAB)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Elementary Standard Arabic, I

Mastery of the Arabic alphabet and phonetics; elementary formal grammar and the development of reading and writing skills; and conversation in the formal noncolloquial style. All students are required to register for one hour per week in the language laboratory. 5 hours.

202. Elementary Standard Arabic, II

Continuation of ARAB 201. All students are required to register for one hour per week in the language laboratory. *Prerequisite:* ARAB 201. 5 hours.

210. Colloquial Arabic, I

Development of conversational fluency in one of the major colloquial dialects; see *Timetable* for dialect to be taught each semester. 4 hours.

211. Colloquial Arabic, II

Continuation of ARAB 210. *Prerequisite:* ARAB 210. 4 hours.

303. Intermediate Standard Arabic, I

Survey of more advanced grammar; emphasis on increasing conversational fluency in the formal noncolloquial style; and reading of prose texts reflecting aspects of Arabic culture. *Prerequisite:* ARAB 202. 5 hours or 1 unit. All students are required to register for one hour per week in the language laboratory.

304. Intermediate Standard Arabic, II

Continuation of ARAB 303. All students are required to register for one hour per week in the language laboratory. *Prerequisite:* ARAB 303. 5 hours or 1 unit.

305. Advanced Standard Arabic, I

Practice to attain conversational fluency in the formal noncolloquial style; introduction to Arabic literature; and readings in social, political, and historic writings. *Prerequisite:* ARAB 304. 3 hours or $\frac{3}{4}$ unit.

306. Advanced Standard Arabic, II

Continuation of ARAB 305. *Prerequisite:* ARAB 305. 3 hours or $\frac{3}{4}$ unit.

307. Topics in Standard Arabic Language and Literature, I

Selected readings from Modern Standard Arabic authors, with a focus on novels, plays, and basic poetry illustrative of Arab cultural issues and advanced level MSA grammar, as well as development of expository writing skills. *Prerequisite:* ARAB 306. 3 hours or $\frac{3}{4}$ unit.

308. Topics in Standard Arabic Language and Literature, II

Continuation of ARAB 307 with increased emphasis on the reading and comprehension of literary texts exemplified in advanced level novels, plays, and poetry, as well as on advanced mastery of expository writing skills. *Prerequisite:* ARAB 307. 3 hours or $\frac{3}{4}$ unit.

309. Advanced Topics in Standard Arabic Language and Literature, I

Introduction to Modern Standard Arabic in the professions as documented in selected newspapers, educational radio and TV programs, works of fiction, biographies, anthologies, and professional journals. Students will be introduced to argumentative writing in MSA, expected to make oral presentations, and to write a research paper in their field. *Prerequisite:* ARAB 308. 3 hours or 1 unit.

310. Advanced Topics in Standard Arabic Language and Literature, II

Continuation of ARAB 309 with increased emphasis on the development of comprehension and writing of professional language. *Prerequisite:* ARAB 309. 3 hours or 1 unit.

Hebrew (HEBR)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Elementary Modern Hebrew, I

Acquaints students with the fundamental principles of the Hebrew language. Develops all four language skills; reading, writing, listening and speaking. Grammar and comprehension are exercised through the textbook,

the audio-visual materials and the computer. Easy stories will be used during the semester to strengthen reading comprehension. Students are required to register for one hour weekly in the language laboratory. *5 hours.*

202. Elementary Modern Hebrew, II

Continuation of HEBR 201, with introduction of more advanced grammar, and with emphasis on more fluency in speaking and reading. *Prerequisite:* HEBR 201 or equivalent. *5 hours.*

205. Introduction to Classical Hebrew, I

Same as RELST 205. Stresses basic grammar of classical (biblical) Hebrew and acquisition of translation skills. *4 hours.*

303. Intermediate Modern Hebrew, I

Advanced examination of the fundamental principles of the Hebrew language. Develops all four language skills: reading, writing, listening and speaking. Grammar and comprehension are exercised through the textbooks, the audio-visual materials and the computer. Examples of Hebrew fiction, largely easy stories, will be used during the semester to strengthen reading comprehension. Students are required to register for one hour weekly in the language laboratory. *Prerequisite:* HEBR 202 or equivalent. *5 hours or 1 unit.*

304. Intermediate Modern Hebrew, II

Continuation of HEBR 303. Concentration on ability to engage in reasonable fluent discourse in Hebrew, comprehensive knowledge of formal grammar, and an ability to read easy Hebrew texts. Israeli television programs and movies are used to develop communicative skills and cultural knowledge. *Prerequisite:* HEBR 303 or equivalent. *5 hours or 1 unit.*

305. Advanced Modern Hebrew, I

For students who have mastered the fundamental principles of the Hebrew language. Develops competence through reading Hebrew fiction and studying Israeli newspapers and television programs. Communication skills are exercised by means of class discussions, oral presentations, compositions and written reports on stories. *Prerequisite:* HEBR 304 or equivalent. *3 hours or ¾ unit.*

306. Advanced Modern Hebrew, II

Course for advanced knowledge of spoken and written standard Modern Hebrew with emphasis on Modern Hebrew literature and language, Israeli newspapers and Israeli television programs. Communication skills are exercised by means of class discussions, oral presentations, compositions and written reports on stories. *Prerequisite:* HEBR 305 or equivalent. *3 hours or ¾ unit.*

307. Topics in Modern Hebrew Language and Literature, I

Selected readings from modern Hebrew authors, with emphasis on the novel and short story; lectures and discussions on Hebrew literature and aesthetics; and detailed analysis of formal Hebrew grammar. *Prerequisite:* HEBR 306 or consent of instructor. *3 hours or ¾ unit.* May be repeated with consent of instructor.

308. Topics in Modern Hebrew Language and Literature, II

Selected readings from modern Hebrew authors, with special emphasis on Eastern European "Revival" literature; lectures and discussions on Hebrew literature and aesthetics; and detailed analysis of formal Hebrew grammar. *Prerequisite:* HEBR 307 or consent of instructor. *3 hours or ¾ unit.* May be repeated with consent of instructor.

Hindi (HINDI)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Elementary Hindi/Urdu, I

Introduction to the Hindi/Urdu language; includes conversation with a native Hindi/Urdu-speaking tutor under the direction of a linguist instructor, and a minimum of formal grammar and Devanagari writing; introduction to Arabic-Persian script by arrangement. All students are required to register for one hour per week in the language laboratory. *5 hours.*

202. Elementary Hindi/Urdu, II

Second term of spoken Hindi/Urdu; includes conversation with a native Hindi/Urdu-speaking tutor under the direction of a linguist instructor, formal grammar based on conversational materials, and work on written Hindi; concentration on written Urdu by arrangement. All students are required to register for one hour per week in the language laboratory. *Prerequisite:* HINDI 201. *5 hours.*

301. Intensive Hindi, I

Intensive course on the Hindi language including conversation with a native Hindi-speaking tutor under the direction of a linguist-instructor; study of the formal grammar and the Devanagari script. *10 hours or 2 units.*

302. Intensive Hindi, II

Includes drill for more advanced conversational fluency; introduction to a greater variety of styles and levels of discourse and usage; increasing study of the written language and more formal grammar; and concentration on ability to engage in reasonably fluent discourse in Hindi, on comprehensive knowledge of formal grammar, and on ability to read ordinary texts in Hindi. All students are required to register for one hour per week in the language laboratory. *Prerequisite:* HINDI 301 or equivalent, or consent of instructor. *10 hours or 2 units.*

303. Intermediate Hindi, I

First term of second year of the Hindi language, including drill for more advanced conversational fluency; introduction to a greater variety of styles and levels of discourse and usage; and increasing study of the written language and more formal grammar. All students in this course are required to register for one hour per week in the language laboratory. *Prerequisite:* HINDI 202 or equivalent. *5 hours or 1 unit.*

304. Intermediate Hindi, II

Concentration on ability to engage in reasonably fluent discourse in Hindi, on comprehensive knowledge of formal grammar, and on ability to read ordinary texts in Hindi. All students in this course are required to register for one hour per week in the language laboratory. *Prerequisite:* HINDI 303 or equivalent. *5 hours or 1 unit.*

305. Advanced Hindi, I

Course for advanced knowledge of spoken and written Hindi. All students are required to work at least one hour each week with a native informant and/or in the language laboratory. *Prerequisite:* HINDI 304 or consent of instructor. *3 hours or ¾ unit.*

306. Advanced Hindi, II

Course for advanced knowledge of spoken and written Hindi with emphasis on modern Hindi literature and language. All students are required to work at least one hour each week with a native informant and/or in the language laboratory. *Prerequisite:* HINDI 305 or consent of instructor. *3 hours or ¾ unit.*

308. Introduction to South Asian Literature

Introduces selected literatures of South Asia in a cross-cultural and comparative perspective: emphasizes relating literary texts and trends to the historical, sociocultural, political, and literary contexts of the subcontinent. Texts for South Asian languages are offered in English translation; in addition, there will be texts by South Asian authors written in English. Knowledge of a South Asian language not required. *Prerequisite:* Consent of course coordinator. *3 hours or ¾ unit.*

Linguistics (LING)

104. Talking Culture

Same as ANTH 104. See ANTH 104.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars. *Prerequisite:* Consent of departmental honors adviser. *1 to 3 hours.* May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Introduction to Language Science

Introduction to the theory and methodology of general linguistics; includes the various branches and applications of linguistics. *3 hours.*

202. Elements of Syntax

Introduction to concepts and techniques essential for syntactic analysis and description, with special attention to testing analyses and justifying them. *Prerequisite:* LING 200. *3 hours.* (Counts for advanced hours in L.A.S.)

210. Language History

Addresses the question "Why does language change?" Specific topics include: the history and origin of writing; why pronunciation changes; change in vocabulary and what it tells us about change in culture and society;

the relation between "language" and "dialect"; multilingualism and its consequences, including Pidgins and Creoles; genetic relationship between languages, with focus on the "Indo-European" family (English, German, French, Russian, Latin, Greek, and Sanskrit, etc.) and the relationships between human languages. *Prerequisite:* Fulfillment of the foreign language requirement of the College of Liberal Arts and Sciences. 3 hours.

225. Elements of Psycholinguistics

Introduction to the theory and methodology of psycholinguistics with emphasis on language acquisition and linguistic behavior. 3 hours.

240. Language in Human History

Role of language in the life of nations as a tool of communication, as a symbol of identity, and as a means of power. Scripts and orthographies, languages planning, culture and language glossopolitics. *Prerequisite:* Three years of high school foreign language study or fulfillment of the foreign language requirement of Liberal Arts and Sciences. 3 hours.

250. Language in the USA

Relationships within the social, linguistic and cultural mosaic of language in the USA; language-related controversies in a historical context and their implications; language diversity, language use, language rights (e.g., English Only, multilingualism); creativity and identity in minority languages; the impact of American English on other Englishes and languages across cultures. 3 hours.

260. American Sign Language

Same as PSYCH, SP ED and SPSHS 260. See SP ED 260.

290. Individual Study

Individual readings and research reports on special topics dealing with the theoretical or applied aspects of the linguistic sciences. *Prerequisite:* Written consent of instructor. 2 to 4 hours. May be repeated to a maximum of 8 hours.

291. Honors Individual Study

Study and research for honors thesis; open only to seniors in the linguistics major who are eligible for departmental distinction. *Prerequisite:* Written consent of instructor and linguistics course average of 3.4. 2 to 4 hours. May be repeated to a maximum of 8 hours. (Counts for advanced hours in L A S.)

300. Introduction to Linguistic Structure

Same as ANTH 300. Introduction to the theory and methodology of the science of linguistics with special reference to phonology and syntax. 3 hours or ½ unit.

301. Introduction to General Phonetics

Introduction to the main branches of general phonetics and phonological theory; emphasis on analysis of non-Western languages and research techniques. 3 hours or ½ unit.

303. Non-Western Linguistic Structures

Intensive study of linguistic structure of a selected non-Western language. 3 hours or 1 unit. May be repeated for credit with consent of instructor.

304. Tutorials in Non-Western Languages

Advanced or intensive language instruction in a selected non-Western language; does not cover instruction in East or Southeast Asian languages. *Prerequisite:* Consent of instructor. 1 to 5 hours, or ½ to 1 unit. May be repeated with consent of instructor.

305. Introduction to Applied Linguistics

Same as EIL 305. Introduction to the applications of general linguistic theory to the specific fields of stylistics, theory of translation, contrastive analyses, and the teaching and learning of foreign and second languages; practical assignment work. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

306. Introduction to Computational Linguistics

Introduces the use of computers in linguistics and application of linguistics in high technology. Topics include spelling and grammar-checking in word processing, natural language and man-machine communication, data organization, language understanding systems, and computer-assisted language instruction. Students write several computer programs. *Prerequisite:* LING 300 or equivalent; and a C S 100-level programming course (not C S 106), or C S 400, or consent of instructor. 3 hours or 1 unit.

307. Introduction to Mathematical Linguistics

Same as ANTH 307. Principles of set theory, logic and formal systems, group theory, and automata theory; introduction to the formal theory of grammars. *Prerequisite:* LING 300. 3 hours or 1 unit.

309. Introduction to Indo-European Linguistics

Same as GRK and LAT 310. Introductory survey of Indo-European languages and their mutual relations; exemplification of methods of reconstruction; principles of comparative phonology and introductory survey of morphology; and discussion of theories about the original home, culture, and society of the Indo-Europeans. *Prerequisite:* Fulfillment of the language requirement of the College of Liberal Arts and Sciences. 3 hours or 1 unit.

310. Historical Linguistics

Introduction to historical and comparative linguistics with particular attention to theoretical issues. *Prerequisite:* LING 300 and 301 or concurrent registration. 3 hours, or ½ to 1 unit.

314. Introductory Coptic, I

Same as COP and RELST 301. See COP 301.

315. Introductory Coptic, II

Same as COP and RELST 302. See COP 302.

316. Structure of the French Language

Same as FR 316. See FR 316.

320. Introduction to African Linguistics

Introduction to genetic and typological classification of the main language families of Africa; concentration on grammatical and phonological characteristics. *Prerequisite:* LING 200 or 300; consent of instructor. 3 hours or 1 unit.

323. Language Acquisition

Same as COMM and PSYCH 323. See PSYCH 323.

325. Introduction to Psycholinguistics

Same as COMM 325. Introductory survey of psychological and linguistic approaches to the study of communication. *Prerequisite:* An introductory course in linguistics or psychology. 3 hours or 1 unit. Credit is not given for both LING 325 and PSYCH 325.

327. Language and the Brain

Same as PSYCH 327. See PSYCH 327.

329. Language of Religion

Same as RELST and SPCOM 329. See RELST 329.

330. Introduction to East Asian Linguistics

Same as EALC 330. Introduction to genetic relation of the Far Eastern languages with other languages; concentration on synchronic analysis of phonology and syntax. *Prerequisite:* LING 300; consent of instructor. 3 hours or 1 unit.

332. Women and Language

Same as SPCOM and W S 332. See SPCOM 332.

335. Neurolinguistics and Second Language Learning

Same as EIL 335. See EIL 335.

338. Philosophy of Language

Same as PHIL 338. See PHIL 338.

340. History of Linguistics

Survey of linguistic theories from ancient to modern times; special emphasis on comparative grammar and the development of structural linguistics; and extended discussion of at least one other period. 3 hours or 1 unit.

350. Introduction to Sociolinguistics

Same as EIL 350. Critical study of the sociologically oriented general linguistic theories. Special reference to language varieties; language attitudes; language diversity; language standardization; and language, ideology and power; emphasis on research methodology and techniques. *Prerequisite:* An introductory course in linguistics or consent of instructor. 3 hours, or ½ or 1 unit.

362. Introduction to Romance Linguistics

Same as FR, ITAL, PORT, RMLNG, and SPAN 362. See SPAN 362.

370. Mind, Culture, and Society

Same as ANTH 370 and COMM 370. See ANTH 370.

375. Speech Science, I

Same as SPSHS and SPCOM 375. See SPSHS 375.

376. Speech Science, II

Same as SPSHS and SPCOM 376. See SPSHS 376.

380. Introduction to Slavic Linguistics

Same as SLAV 380. See SLAV 380.

386. Computer-Based Foreign Language Teaching

Same as CLCIV, E I L, FR, GER, HUMAN, ITAL, PORT, SLAV, and SPAN 382. See HUMAN 382.

388. English Phonology and Morphology for ESL Teachers

Same as E I L 388. See E I L 388.

389. Theoretical Foundations of Second Language Acquisition

Same as FR 381, and E I L, GER, ITAL, PORT, and SPAN 389. See E I L 389.

390. Special Topics in Linguistics

Course provides an opportunity to focus on various subfields of the linguistic sciences, depending on the interests of the faculty and students. *Prerequisite:* LING 200, 300, or consent of instructor. 3 hours or 1 unit. May be repeated as topic varies, to a maximum of 9 hours or 3 units. Students may register for up to two sections in the same semester.

396. Introduction to Linguistics

Multisection course offering introductory instruction and field methods experience in linguistics. 1 hour or ¼ unit. May be repeated in the same semester to a maximum of 8 hours or 2 units. Approved for S/U grading.

400. Introduction to General Linguistics

Same as ANTH 400 and E I L 402. Introduction to the linguistic sciences; linguistic theory and methodology; and branches of linguistics and their application. 1 unit. Credit may not be applied toward a graduate degree in linguistics.

401. Syntax

Introduction to the fundamental concepts, philosophy, and methods of syntactic theory. *Prerequisite:* LING 300 or equivalent. 1 unit.

402. Phonology

Examination of language-specific phonological problems with a view toward formulating a language-independent theory of phonology. *Prerequisite:* LING 301 or consent of instructor. 1 unit.

403. Seminar in Linguistic Analysis

Discussion of advanced topics of current interest. *Prerequisite:* LING 401 and 402. ½ or 1 unit. May be repeated for credit with consent of instructor.

404. Practicum

Supervised practical experience in extended linguistic research on individual topics of the student's choice. *Prerequisite:* LING 401 and 402. 1 unit.

406. Topics in Computational Linguistics

Speech sampling and linguistic redundancy; phonology in speech recognition; syntactic parsing of natural language; domains of linguistic knowledge including lexical, syntactic, semantic, discourse, and pragmatic representations; quantitative reasoning; linguistic expert system; speech synthesis. *Prerequisite:* LING 306 and 401; LING 402 or consent of instructor. 1 unit.

408. Russian Phonology

Same as RUSS 408. See RUSS 408.

410. Topics in African Linguistics

Discussion of advanced selected topics in African linguistics; concentration on morphology, tonology, phonology, sociolinguistics, language acquisition, and syntax. *Prerequisite:* LING 401 and 402; or consent of instructor. 1 unit. May be repeated as topics vary in the same semester to a maximum of 2 units or in subsequent semesters to a maximum of 3 units.

413. Pedagogical Grammar

Same as E I L 412. See E I L 412.

415. Topics in Applied Linguistics

Same as E I L 415. Advanced seminar to critically evaluate linguistic theories by discussing their applications to language-related areas such as contrastive linguistics, corpus linguistics, language acquisition, language and literacy, language policy, language standardization, text linguistics, and translation. *Prerequisite:* LING 300, 305, 350, or 400, or consent of instructor. 1 unit. May be repeated in the same or subsequent semesters to a maximum of 3 units, as topics vary.

416. Field Methods

Analysis of the phonetic, phonological, morphological, and syntactic structure of an undescribed language through the elicitation of data from a native language consultant. The class develops a linguistic sketch of the language, including a computerized lexicon. *Prerequisite:* LING 401 and 402. 1 unit.

420. Linguistic Phonetics

Principles of scientific description of the phonic aspect of language; distinctive features and phonetic alphabets; relations between phonetics and other linguistic levels; and inventory of speech sounds. *Prerequisite:* LING 301 or equivalent. 1 unit.

424. Developmental Psycholinguistics

Same as COMM and PSYCH 424. See PSYCH 424.

425. Psycholinguistics

Same as COMM and PSYCH 425. See PSYCH 425.

429. Second Language Acquisition and Bilingualism

Same as PSYCH 429. Research seminar: students will design and execute a research project on second language acquisition and/or bilingualism. *Prerequisite:* Consent of instructor. 1 unit.

441. Syntax, II

Issues in the theory and practice of syntactic description, with special attention to implications for universal grammar. *Prerequisite:* LING 401 or consent of instructor. 1 unit.

442. Phonology, II

Continuation of LING 402. *Prerequisite:* LING 402. 1 unit.

450. Linguistics and the Study of Meaning

Consideration of those aspects of meaning which are the concern of linguistic theory. *Prerequisite:* LING 300. 1 unit.

451. Pragmatics

Examination and development of theories of language use, addressing the role of pragmatics in linguistics and in linguistic theory, with special attention to the major research questions concerning natural language processing. *Prerequisite:* LING 401 and 450, or consent of instructor. 1 unit.

460. Seminar in Bilingualism

Research-oriented seminar on theoretical and applied aspects of bilingualism; critical evaluation of linguistic, neurolinguistic, sociolinguistic, and psycholinguistic approaches to bilingualism; and concentration on selected case studies from Western and non-Western societies, especially Asia and Africa. *Prerequisite:* LING 350 or an introductory course in linguistics. 1 unit.

462. Seminar in Romance Linguistics

Same as FR, ITAL, PORT, RMLNG, and SPAN 462. See SPAN 462.

470. Proseminar in Cognitive Science

Same as ANTH 470, C S 449, EDPSY and PSYCH 471. See ANTH 470.

475. Experimental Phonetics I: Speech Physiology

Same as SPSHS 400. See SPSHS 400.

476. Experimental Phonetics II: Speech Acoustics and Perception

Same as SPSHS 401. See SPSHS 401.

481. Topics in Syntactic Theory

Investigation of syntactic universals; recent developments in the theory of syntax. *Prerequisite:* LING 441 or consent of instructor. 1 unit. May be repeated as topics vary with consent of instructor.

482. Topics in Phonological Theory

Recent developments in the theory of phonology. *Prerequisite:* LING 442 or consent of instructor. 1 unit. May be repeated for credit as topics vary with consent of instructor.

490. Special Topics in Linguistics

Individual studies in the areas of linguistics not covered by regular course offerings. ½ to 2 units.

495. Advanced Topics in Linguistics

Advanced seminar-style instruction on selected topics in Linguistics. *Prerequisite:* Basic grounding in linguistics or consent of instructor. ¼ unit. May be repeated in the same semester to a maximum of 2 units. Approved for S/U grading.

496. Advanced Seminar in Linguistics

Advanced seminar-type instruction on selected topics in Linguistics. *Prerequisite:* Basic grounding in linguistics or consent of instructor. ¼ unit. May be repeated in the same semester to a maximum of 2 units. Approved for S/U grading.

499. Thesis Research

0 to 4 units.

Persian (PERS)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Elementary Persian, I
Introduction to Persian, including conversation with a native speaker under the direction of a linguist-instructor, and a minimum of formal grammar and writing. 5 hours.

202. Elementary Persian, II
Continuation of PERS 201, with introduction of more advanced grammar and with emphasis on more fluency in speaking and reading. *Prerequisite:* PERS 201 or equivalent. 5 hours.

205. Introduction to Persian Culture and Literature, I
Same as C LIT 203. A survey of Persian civilization with emphasis on Persian literary and aesthetic expression. 3 hours. Knowledge of Persian is not required.

206. Introduction to Persian Culture and Literature, II
Same as C LIT 204. Continuation of PERS 205. Survey of Persian civilization with emphasis on Persian literary and aesthetic expression. 3 hours. Knowledge of Persian is not required.

303. Intermediate Persian, I
General review of the essentials of grammar, selected reading of materials emphasizing Iranian life and culture, compositions, and practice in speech. *Prerequisite:* PERS 202. 5 hours or 1 unit.

304. Intermediate Persian, II
General review of the essentials of grammar, selected reading of materials emphasizing Iranian life and culture, compositions, and practice in speech. *Prerequisite:* PERS 303. 5 hours or 1 unit.

Sanskrit (SANSK)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Elementary Sanskrit, I
Introduction to Sanskrit, treating in full the grammar of the language as preparation for reading. 4 hours.

202. Elementary Sanskrit, II
Continuation of SANSK 201. *Prerequisite:* SANSK 201. 4 hours.

303. Readings in Sanskrit, I
Same as RELST 312. Introduction to the reading of Sanskrit texts. *Prerequisite:* SANSK 202. 3 hours or 1 unit.

304. Readings in Sanskrit, II
Same as RELST 313. Readings in Sanskrit texts. Topics may vary according to students' needs; they may include religious texts, classical literature, or a general survey of texts. *Prerequisite:* SANSK 303 and consent of instructor. 3 hours or 1 unit. May be repeated as topics vary.

MANUFACTURING ENGINEERING

Director of Program: S. G. Kapoor
Program Office: 352 Computer and Systems Research Lab., 1308 West Main Street, Urbana
Phone: 333-3432

Manufacturing Engineering (MFG E)

210. Introduction to Manufacturing Systems

Broad-based introduction of various topics in manufacturing engineering including materials processing, manufacturing automation and process control, product/process design, and planning. *Prerequisite:* Junior standing in Engineering or consent of instructor. 3 hours.

320. Decision-Making and Control Applications in Manufacturing

Integrates production planning, production scheduling, and process supervision and control into a manufacturing hierarchy. Demonstrates interfaces with other manufacturing functions. Focuses on the integration of the functions as well as the integration of decision-making and control considerations. *Prerequisite:* Consent of instructor. A course in probability is desirable. 3 hours or $\frac{3}{4}$ unit. Not available for graduate credit for students in the College of Engineering, except by special permission of the student's department.

330. Interfacing Methods for Manufacturing Systems

Introduction to the basic concepts and practical techniques of the real-time computing and software interfacing for manufacturing systems. Topics covered include: interfacing of sensors and actuators used in manufacturing systems; computer interfacing and real-time monitoring of machine tools and robots; intercomputer communication through network for a manufacturing cell; and human-machine-computer interfaces. *Prerequisite:* C S 101 or equivalent. 3 hours or $\frac{3}{4}$ unit. Not available for graduate credit for students in the College of Engineering, except by special permission of the student's department.

350. Information Management for Manufacturing Systems

Introduction to the role of information in manufacturing systems, components of an information system, structures for data storage, data maintenance, data base management systems, and networking data. *Prerequisite:* C S 101 or equivalent. 3 hours or $\frac{3}{4}$ unit. Not available for graduate credit for students in the College of Engineering, except by special permission of the student's department.

393. Special Topics in Manufacturing Engineering

Study of advanced problems related to manufacturing engineering. *Prerequisite:* Senior standing or consent of instructor. 1 to 3 hours.

MATERIALS SCIENCE AND ENGINEERING

Head of Department: James Economy
Department Office: 201 Metallurgy and Mining Building, 1304 West Green Street, Urbana
Phone: 333-1441
URL: www.mse.uiuc.edu

Including Ceramic Engineering (CER E) and Materials Science and Engineering (MATSE)

Ceramic Engineering (CER E)

299. Senior Thesis

Research in ceramics and ceramic engineering. Written permission from the instructor with whom the student is to work must be presented to the student's adviser at the time of registration. To receive credit, a thesis must be presented. *Prerequisite:* Senior standing; grade-point average of 3.0 or better. 1 to 5 hours. May be repeated to a maximum of 5 hours. Minimum total credit of 3 hours is required.

320. Ceramic Materials and Properties
Same as MATSE 320. See MATSE 320.

321. Ceramic Processing and Microstructure Development
Same as MATSE 321. See MATSE 321.

322. Process Design
Same as MATSE 322. See MATSE 322.

323. Ceramic Engineering Processing Laboratory
Same as MATSE 323. See MATSE 323.

324. Refractory Technology
Same as MATSE 324. See MATSE 324.

326. Chemistry and Technology of Glass
Same as MATSE 326. See MATSE 326.

327. Ceramic Microscopy
Same as MATSE 327. See MATSE 327.

328. Electrical Ceramics
Same as MATSE 328. See MATSE 328.

330. Chemically Bonded Ceramics
Same as MATSE 330. See MATSE 330.

390. Special Topics in Ceramics
Independent study projects and courses on special topics. *Prerequisite:* Consent of instructor. 1 to 5 hours, or $\frac{1}{4}$ to 2 units. May be repeated. Students may also register in this course more than once in a semester to a maximum of 10 hours or 3 units.

420. Ceramic Chemistry
Same as MATSE 420. See MATSE 420.

422. Dielectric Properties of Ceramic Materials
Same as MATSE 422. See MATSE 422.

425. Physical Chemistry of Clays and Soils
Same as MATSE 425 and NRES 414. See NRES 414.

426. Mineralogy of Clays
Same as GEOL 461 and MATSE 426. See GEOL 461.

427. Petrology of Clay Minerals
Same as GEOL 462 and MATSE 427. See GEOL 462.

429. Seminar in Ceramics
Same as MATSE 429. See MATSE 429.

497. Research Seminars
Same as MATSE and MET E 497. See MATSE 497.

499. Thesis Research
Research in any of the branches of ceramics.
Prerequisite: Graduate standing in ceramic engineering. 0 to 4 units.

Materials Science and Engineering (MATSE)

100. Materials Lectures
Lecture and demonstration course by the faculty to introduce freshmen to the field of materials science and engineering. 1 hour.

101. Materials in Today's World
Introduces the field of materials science in a format suitable for non-engineering students. Materials and their properties are examined in the context of their use in everyday objects including sports equipment, automobiles, aircraft, display screens, compact disc players, hip-replacements, etc. The role materials have played and will continue to play in shaping society will be discussed. Examples and demonstrations will be the major component in this course. Course is intended as an elective for non-engineering students. Course may not be taken as a technical elective by students in the College of Engineering. 3 hours.

182. Introduction to Materials Science and Engineering
Provides an overview of MATSE as a basis for understanding how structure/property/processing relationships are developed and used for different types of materials. Illustrates the role of materials in modern society by case studies of advances in new materials and processes. Laboratory/discussion periods will be devoted to demonstrations and experiments that illustrate the lectures. Design teams will analyze or synthesize objects that use materials creatively. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated to a maximum of 5 hours. Students may also register in this course more than once in the same semester to a maximum of 5 hours.

200. Introduction to Engineering Materials
Introduction to the materials science and engineering of ceramics, electronic materials, metals and polymers. Bonding; crystallography; imperfections; processing and properties of semiconductors, polymers, metals, ceramics and composites; and phase diagrams. Case

studies will be used to exemplify the lecture material. *Prerequisite:* PHYCS 112, MATH 242, and credit or concurrent registration in PHYCS 114. 3 hours. Students may not receive credit for both MATSE 200 and either T A M 224 or M E 231.

201. Phases and Phase Relations
Provides the basis for understanding microstructure. Treats in quantitative terms and at some depth the concept of phases (crystalline and noncrystalline structures) and the relationships between phases (phase diagrams). Describes commercial practices for producing desired microscopic phase configurations and macroscopic shapes (processing). *Prerequisite:* CHEM 102, MATSE 182, PHYCS 112, MATH 242 or consent of instructor. 3 hours. Students may not receive credit for both MATSE 201 and 200.

204. Electronic Properties of Materials
Study of the electronic structure and bonding of materials, electrical conduction in metals and semiconductors, and dielectric and magnetic properties of solids. *Prerequisite:* PHYCS 114 and junior standing in science or engineering, or consent of instructor. 3 hours. Students may not receive credit for both MATSE 204 and PHYCS 389. (Students may substitute PHYCS 389 for MATSE 204 as part of the Materials Science and Engineering degree requirements).

206. Mechanics of Materials and Fluids
Same as T A M 206. See T A M 206.

207. Materials Science and Engineering Lab, I
Laboratory course to be taken simultaneously with or following MATSE 200 and 305. Experiments using optical and scanning electron microscopy and various thermal and thermodynamic measuring techniques. Introduction to use of laboratory test instruments. *Prerequisite:* Completion of campus Composition I requirement; credit or concurrent registration in MATSE 301, and 305, and I E 230. 3 hours.

208. Materials Science and Engineering Lab, II
Experiments characterizing mechanical, transport, and magnetic-electric properties of materials. *Prerequisite:* Completion of campus Composition I requirement; MATSE 207; and credit or concurrent registration in MATSE 204 and 306. 3 hours.

290. Special Topics in Materials Science and Engineering
Structured presentations of new and developing areas of knowledge in materials science and engineering offered by the faculty to augment the formal courses available. 1 to 4 hours. May be repeated in the same or subsequent semesters as topics vary.

296. Independent Study in Materials Science and Engineering
Individual study of any topic in materials science and engineering selected by the student and conducted under the supervision of a member of the faculty. *Prerequisite:* Sophomore standing or higher. 1 to 4 hours. May be repeated in subsequent semesters as topics vary.

297. Senior Seminar
Review of current materials science and engineering literature, classroom reports and discussions, preparation of technical abstracts and reports. Consideration of professional practice, job selection, employment practice, continuing education, professional growth and economics of the materials industries. *Prerequisite:* Senior standing in the materials science and engineering program. 2 hours.

299. Senior Thesis
Individual research in an area of materials science and engineering under the supervision of members of the staff. Results of research may be used for a senior (undergraduate) thesis. *Prerequisite:* Senior standing, GPA of 3.0 or better, and consent of instructor. 1 to 5 hours. May be repeated to a maximum of 6 hours; a minimum total credit of 3 hours is required.

301. Thermodynamics of Materials
Same as CHEM 245. Examines basic thermodynamic principles including energy, entropy, and free energy; describes the macroscopic properties of various materials systems such as equilibrium states, phases, and phase transitions; emphasizes metals, ceramics, polymers, and electronic materials. Particular attention is paid to the application of phase diagrams; introduces the statistical interpretation of thermodynamics on the atomistic level. *Prerequisite:* CHEM 102; PHYCS 112; and MATH 242 or 285. 4 hours or 1 unit. Students may not receive credit for both MATSE 301 and CHEM 245 or 344.

302. Kinetic Processes in Materials
Studies kinetics of chemical reactions; rate equations, reaction mechanisms; transport processes; diffusion equations, atomic and molecular diffusion. Phase transformations; nucleation, crystallization, displacive, spinodal decomposition. Examines surface and interface phenomena; sintering, grain growth, recovery and recrystallization. *Prerequisite:* MATSE 200 and 301. 3 hours or ¾ unit.

303. Synthesis of Materials
Studies fundamentals of the synthesis of materials. Examines principles of synthesis; processes, approaches, synthetic methodology and probes; methodologies in materials synthesis; polymerization, sol-gel processes, liquid and vapor phase synthesis, materials coupling reactions, and precursor-derived, radiation-induced and asymmetric synthesis. *Prerequisite:* MATSE 200 and credit or concurrent registration in MATSE 301. 3 hours or ¾ unit.

305. Microstructure Characterization
Study of the fundamentals and applications of various forms of microscopy and diffraction for characterization of physical microstructure of materials and of various forms of spectroscopy for characterization of chemical microstructure. *Prerequisite:* PHYCS 114, CHEM 102, MATSE 201. 3 hours or ¾ unit.

306. Thermal-Mechanical Behavior of Materials
Studies fundamentals of elastic, viscoelastic and plastic deformation of materials, elementary theory of statics and dynamics of dislocations; examines strengthening mechanisms

and behavior of composites; fracture and fatigue behavior; fundamentals of thermal behavior; heat capacity, thermal expansion and conductivity; effects of thermal stress. *Prerequisite:* T A M 206 and MATSE 301. 3 hours or $\frac{3}{4}$ unit. Students may not receive credit for both MATSE 306 and either CEE 310, M E 231, or T A M 224.

320. Ceramic Materials and Properties

Same as CER E 320. Basic principles and understanding of ceramic materials and properties, emphasizing structure-property relations. Gives a fundamental appreciation of the development, use, and control of the properties of a wide variety of ceramic materials from a physico-chemical point of view. *Prerequisite:* Junior standing in engineering, or consent of instructor. 3 hours or $\frac{3}{4}$ unit. Graduate students in ceramic engineering or the ceramic concentration in materials science may not receive credit for this course.

321. Ceramic Processing and Microstructure Development

Same as CER E 321. Basic principles and understanding of microstructure development and processing of ceramic materials will be addressed, with an emphasis on structure-property-processing relationships. Knowledge of a variety of processing methodologies and their effects on microstructural development will be gained. Examples of several ceramic components will be illustrated and discussed within this context. *Prerequisite:* MATSE 320 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. To receive the additional $\frac{1}{4}$ unit credit a term paper is required.

322. Process Design

Same as CER E 322. Reviews the basic concepts of heat and mass transfer, control theory and statistical analysis in the context of fabrication processes typical of materials industries; supplements the numerical procedures and algorithms that constitute a computational repertoire, adequate for the engineering practice. In the frame of an actual engineering design project, the combined application of the principles of materials processing, plant layout, reactor design, peripheral facilities, logistics of supply, and economic feasibility are practiced. *Prerequisite:* MATSE 321. 3 hours or $\frac{3}{4}$ unit.

323. Ceramic Engineering Processing Laboratory

Same as CER E 323. Experiments and demonstrations involving a wide range of modern ceramic processing methods will be conducted to develop fundamental understanding of the relationships between raw materials, processing methods, microstructural development, and physical properties. The lab emphasizes the underlying physics and chemistry of processing, as well as designing processing routes to achieve desired material properties. Technical reports will be required. *Prerequisite:* MATSE 321. 3 hours or $\frac{3}{4}$ unit.

324. Refractory Technology

Same as CER E 324. Engineering properties and thermochemistry of polycrystalline materials for use at elevated temperatures including processing of raw materials and the manufacture, heat treatment, quality control,

and specification of refractory products; particular emphasis on oxides, silicates, carbides, borides, cermets, and refractory metals with a correlation of the properties of those materials to certain design criteria. Includes laboratory if taken for 1 unit of graduate credit. *Prerequisite:* Senior standing in engineering. 3 hours, or $\frac{3}{4}$ or 1 unit.

326. Chemistry and Technology of Glass

Same as CER E 326. Introduces the fundamentals of glass science and technology. Provides a comprehensive overview of the ubiquitous phenomena associated with the amorphous state of matter, including glass transition and viscous relaxation, as well as the mechanical, optical, and dielectric properties of glasses. These behaviors are discussed in the context of different thermodynamic, structural, and kinetic models. The use of various characterization techniques for the understanding of the glassy state are reviewed. Different methods for processing, forming, and treatment of glasses are contrasted, using examples of conventional and new high-technology applications. *Prerequisite:* Consent of instructor or senior undergraduate or graduate standing in Engineering, Chemistry or Geology. 3 hours or $\frac{3}{4}$ unit.

327. Ceramic Microscopy

Same as CER E 327. Studies the optical activity in isotropic and anisotropic media with particular emphasis on the materials and products of ceramics; the application of these principles and related topics of optical microscopy to the study of the morphology, aggregation, size, and microstructure of the products of high-temperature thermochemical reactions and equilibria. Includes studies in thermal microscopy if taken for 1 unit of graduate credit. *Prerequisite:* CER E 205 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

328. Electrical Ceramics

Same as CER E 328. Presents the subject of dielectric crystals and their electrical properties; discussion and correlation of ferroelectric and piezoelectric properties of several crystal classes; coverage in detail of the perovskite class of ferroelectric compounds; and discussion of spinel, garnet, and hexagonal type ferrimagnetic crystals and their properties. *Prerequisite:* MATSE 321 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

330. Chemically Bonded Ceramics

Same as CER E 330. Examines the principles and technology of producing ceramic materials bonded by hydrated compounds formed by hydration reactions of inorganic cements. *Prerequisite:* Senior standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

340. Advanced Mechanical Properties of Solids

Advanced presentation of the mechanical behavior of solids; examines crystal plasticity, dislocations, point defects and grain boundaries, creep and fatigue behavior, fracture. *Prerequisite:* MATSE 306 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

341. Metals Processing

Discussion of melt, mechanical, thermal, powder and surface processing of metals.

Extraction of metals, joining of metals, metal composites and metal recycling are also reviewed. The relationships between the processing of metals, the microstructures that are produced and the behavior of metal components are emphasized. *Prerequisite:* Senior standing in MATSE, or CEE 210 or ME 231 or MATSE 346 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

342. Metals Laboratory

Advanced metallurgy laboratory. Examines effects of heat treatment; mechanical testing, oxidation and corrosion; and metallography of selected alloys. *Prerequisite:* MATSE 207, 208, and 340. 3 hours or $\frac{3}{4}$ unit.

343. Design of Engineering Alloys

Examines the application of science and engineering principles to the design, selection and performance of engineering alloys. Studies alloy classes, design, effect of alloying elements, relation to processing variables, and structure-property relationships; design project. *Prerequisite:* MATSE 340, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

344. Welding and Joining Processes

Same as CEE 375. The physical principles of fusion welding; heat flow; thermal cycles; physical metallurgy and mechanical properties of welded joints; applications of welding to large structures; testing of welds; nondestructive testing; design, economics, and weld specifications; and laboratory experiments in welding. *Prerequisite:* T A M 224, 206 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

345. Corrosion of Metals

Electrochemistry, thermodynamics, and kinetics of corrosion; behavior of ferrous and nonferrous metals; corrosion rates; corrosion control; cathodic and anodic protection; high-temperature corrosion; corrosion testing; and electrolytic machining methods. 3 hours, or $\frac{3}{4}$ or 1 unit.

346. Properties and Selection of Engineering Materials

In this course the mechanical, chemical and thermal behavior of different classes of materials (metals, ceramics, polymers and composites) will be compared and contrasted. Consideration of the trade-offs in selecting materials for specific applications will be considered and exemplified by case studies. *Prerequisite:* T A M 206 or 150 and 221. 3 hours. Not available for credit to students in MATSE.

350. Introduction to Polymer Science and Engineering

Fundamentals of polymer science and engineering. Polymer solution properties, conformation and molecular weight characterization. Rheological and viscoelastic behavior: relaxations and transitions, rubber elasticity. Crystallinity, morphology and deformation of crystalline polymers. Blends and composites. Methods of fabrication. *Prerequisite:* Advanced undergraduate or graduate standing. 3 hours, or $\frac{3}{4}$ or 1 unit. Students in the polymer concentration in materials science and engineering may not receive graduate credit for this course.

351. Introduction to Polymer Synthesis

Fundamentals of polymer synthesis and configuration characterization. Examines step-growth, addition, and coordination polymerization; kinetics and molecular weight distributions. Studies co-polymers; applications of IR, NMR, and ESCA to configuration characterization. *Prerequisite:* Concurrent registration in MATSE 350, or consent of instructor. 1 hour or ¼ unit. Students may not receive credit for both MATSE 351 and 303.

352. Polymer Characterization Laboratory

Characterizes polymeric materials experimentally to investigate molecular, microstructural and macroscopic aspects of their mechanical, thermal, electrical, and optical properties. *Prerequisite:* MATSE 350 or consent of instructor. 3 hours, or ¾ or 1 unit.

353. Plastics Engineering

Introductory course to plastics engineering. Examines components of plastics and data banks; viscoelasticity, yield, and fracture; reinforced polymers; and forming, design (project), and current advances. *Prerequisite:* MATSE 350. 3 hours or ¾ unit.

355. Polymer Physics, I: Structure and Properties

Techniques and applications of polymer crystal structure and morphology observation; x-ray, electron, light and neutron scattering and diffraction; light and electron microscopy. Morphology-processing property relationships of crystalline polymers, blends and co-polymers; liquid, plastic and condense crystals; deformation mechanisms and orientation characterization; relaxations and transitions; crystallization theory. *Prerequisite:* MATSE 350 or consent of instructor. 3 hours or ¾ unit.

357. Polymer Chemistry

Same as CHEM 357. Comprehensive overview and examination of the methods used to synthesize macromolecules. Both descriptive and mechanistic organic chemistry, as it relates to polymer synthesis, are discussed. *Prerequisite:* Senior standing in MATSE or CHEM. 3 hours, or ¾ or 1 unit.

358. Polymer Physical Chemistry

Same as CHEM 358. Intermediate level introduction to the fundamental physical chemistry of polymer systems. Focus is on equilibrium conformation, structure, properties and phase transitions of polymer solutions, dense melts, liquid crystals, mixtures, block copolymers, surfaces and interfaces, and electronic polymers. *Prerequisite:* 300-level course in thermodynamics, statistical thermodynamics, or physical chemistry. 3 hours, or ¾ or 1 unit.

360. Electronic Materials and Processing, I

Introduces senior engineers and new graduate students to the materials science, engineering, and processing of semiconductors. The structure and chemistry of semiconductors are related to the electronic and optical properties. Includes: how semiconductors are produced and how to control processing to achieve desired materials properties; how to design and produce novel materials to obtain superior performance from electronic devices. *Prerequisite:* PHYS 114, MATH 285 (or

consent of instructor), MATSE 303, and either MATSE 204, PHYS 389 or equivalent. 3 hours or ¾ unit.

361. Electronic Materials and Processing, II

Introduction to the materials science, engineering, and processing of microlithographic materials, conductors and dielectrics for electronic applications. The course makes use of the concepts developed in materials science to understand why certain materials make acceptable contacts and dielectrics while others do not. Demonstrates how manufacturing problems can be overcome with careful materials design and processing. Examines some of the processing techniques commonly used in microelectronic circuit manufacture during metallization, dielectric formation and lithography. *Prerequisite:* MATSE 360, or consent of instructor. 3 hours or ¾ unit.

362. Electronic Materials Laboratory

Introduces seniors and new graduate students to the fabrication, analysis, and properties of thin film materials through a combination of lectures and experiments in the Materials Science and Engineering instructional laboratories. Covers both the principles and practice of: (a) deposition of thin film materials by vacuum evaporation, sputtering, and plasma assisted processes; (b) modification of properties by thermal reaction, surface treatment, etc.; (c) measurement of key properties including electrical conductivity, optical indexes, magnetic hysteresis, and internal stress. Methods to optimize the film microstructure and engineering properties via the growth technique are emphasized. *Prerequisite:* MATSE 360 or consent of instructor. 3 hours or ¾ unit.

380. Surfaces and Colloids

Introduction to the chemistry and physics of surfaces and interfaces, with emphasis on behavior in liquid media; major areas include surface composition, surface and interfacial forces, colloidal stability and flocculation, and amphiphilic molecules. *Prerequisite:* MATSE 301, CHEM 342, or PHYS 361; or equivalent undergraduate course in thermodynamics or physical chemistry, or consent of instructor. 3 hours, or ¾ or 1 unit.

381. Electron Microscopy and Diffraction Theory

Theory and application of transmission electron microscopy and diffraction with emphasis on thin crystals; electron optics, interference phenomena, interpretation of images and diffraction patterns, specimen preparation, etc. *Prerequisite:* MATSE 305 or equivalent. 3 hours or 1 unit.

382. Computer Simulation Studies in the Physical and Social Sciences

Same as CSE 372, and ECON 370. Section A – Computer Simulation Studies for Physical Scientists: Students learn how to develop computer models to simulate a variety of phenomena that are significant in the physical sciences, such as: solidification, phase ordering, interfacial diffusion, adsorption-desorption, percolation and gelation, excitable media, fracture. Section B – Computer Simulation Studies for Social Scientists: Students learn how to develop computer models to simulate a variety

of phenomena that are significant in the social sciences, such as: the prisoner's dilemma problem and its variants, social norms, cultural transmission, role models, fads and fashions, stock market bubbles and crashes. *Prerequisite:* Graduate standing, junior or senior standing, or consent of instructor. 3 hours or ¾ unit.

384. Metal Matrix and Ceramic Matrix Composites

Introduction to metal and ceramic matrix composites, with an emphasis on understanding the interrelationships between processing, microstructure and properties. The basis for selecting these systems for different engineering applications are considered. *Prerequisite:* Senior standing in Engineering or consent of instructor. 3 hours, or ¾ or 1 unit. To receive 1 unit credit a comprehensive term paper is required.

385. Atomic-Scale Simulations

Same as PHYS 363, and CSE 373. The objective is to learn and apply fundamental techniques of Monte Carlo and Molecular Dynamics used in (primarily classical) simulations in order to help understand and predict properties of microscopic systems in materials science, physics, biology, and chemistry. Numerical algorithms, connections between simulation results and real properties of materials (structural or thermodynamic), as well as statistical and systematic error estimation using real simulation programs will be emphasized. A simulation project composed of scientific research, algorithm development, and presentation is required. *Prerequisite:* A course in statistical mechanics, or statistical thermodynamics, and prior experience in programming in C, C++, or Fortran, or consent of instructor. 3 hours or 1 unit.

390. Special Topics in Materials Science and Engineering

Structured presentations of new and developing areas of knowledge in materials science and engineering offered by the faculty to augment the formal courses available. *Prerequisite:* Senior or graduate standing. 1 to 4 hours, or ¼ to 1 unit. May be repeated including in the same term.

392. Fundamentals of Laboratory Safety

Same as CHEM 393. Presents key aspects of laboratory setups, operating procedures and emergency preparedness measures necessary for the experimentalist at UIUC, and in his/her future career. 1 hour or ¼ unit. Credit earned does not count toward M.S. or Ph.D. degree in MATSE.

396. Independent Study in Materials Science and Engineering

Individual study of any topic in materials science and engineering under the supervision of a member of the faculty. *Prerequisite:* Senior or graduate standing and consent of instructor. 1 to 4 hours, or ¼ to 1 unit. May be repeated in subsequent semesters to a maximum of 4 hours or 1 unit.

400. Statistical Thermodynamics of Materials

Presents the atomistic concepts of statistical thermodynamics and shows its relationship to classical phenomenological thermodynamics. Applies the methods of statistical thermodynamics and statistical mechanics to describe the properties of a variety of materials, especially ceramics, polymers, electronic materials and metals. *Prerequisite:* Undergraduate course in thermodynamics or consent of instructor. 1 unit.

401. Kinetic Processes in Materials

Examines the fundamentals of rate processes in materials, both from a phenomenological and an atomistic point of view, with special emphasis on the kinetics of transformations and the transport of matter in solids. *Prerequisite:* Graduate course in statistical thermodynamics or consent of instructor. 1 unit.

420. Crystal Physics and Structure-Property Relations

Same as CER E 420. Presentation of the concepts of structure-property relationships, point and space group symmetries, application of Neumann's principle, crystalline anisotropy, and the limiting symmetry groups. Influence of symmetry on first, second, third, and fourth ranked polar and axial tensor properties. Properties covered include, dielectric, piezoelectric, elastic, magnetic, thermal and electrical conductivity, galvanomagnetic, thermoelectric, optic, and electro-optic. *Prerequisite:* MATSE 305 or equivalent, MATSE 400, consent of instructor. 1 unit.

422. Dielectric Properties of Ceramic Materials

Same as CER E 422. Review of fundamental properties of vector fields; consideration of the reaction of insulating solids to external electric fields in terms of dielectric theory; the properties of ceramic dielectrics including treatment of ferroelectrics in terms of present theory; and correlation of the piezoelectric properties of ferroelectric crystals and ceramics with the crystal structure, microstructure, and the ferroelectric properties. *Prerequisite:* Consent of instructor. $\frac{3}{4}$ or 1 unit.

425. Physical Chemistry of Clays and Soils

Same as CER E 425 and NRES 414. See NRES 414.

426. Mineralogy of Clays

Same as CER E 426 and GEOL 461. See GEOL 461.

427. Petrology of Clay Minerals

Same as CER E 427 and GEOL 462. See GEOL 462.

429. Seminar in Ceramics

Same as CER E 429. Seminar on current research in ceramic science and engineering; includes presentations by visiting lecturers, staff and students. *Prerequisite:* Graduate standing. 0 or $\frac{1}{4}$ unit. May be repeated to a maximum of $\frac{1}{2}$ unit.

440. Defects and Plastic Deformation in Metals

Studies point, line, and surface defects in metals; configuration, thermodynamics, and

motion; quantitative description of single dislocation properties; and interactions among defects. For students in metallurgy, ceramics, physics, and other solid state sciences. *Prerequisite:* MATH 345 and MATSE 306; or consent of instructor. 1 unit.

441. Dislocations and Mechanical Properties of Metals

General static and dynamic properties of single dislocations in crystals; dislocation interactions; properties of dislocation arrays; and role of dislocations in metallurgical phenomena with particular emphasis on mechanical properties. *Prerequisite:* Consent of instructor. 1 unit.

442. Solidification Processing

Same as M E 452. See M E 452.

459. Seminar in Polymers

Seminar on current research in polymer science and engineering; includes presentations by visiting lecturers, staff and students. *Prerequisite:* Graduate standing. 0 or $\frac{1}{4}$ unit. May be repeated to a maximum of $\frac{1}{2}$ unit.

461. Electronic Properties of Crystalline Solids

Derives and describes the electronic properties of crystalline solids. Topics include crystal structure, electronic band structure, electron transport, and defects in metals, semiconductors, and ceramics. *Prerequisite:* MATSE 204 or PHYCS 389. 1 unit.

462. Electrical and Optical Characterization of Electronic Materials

Presents the theory and application of advanced optical and electronic characterization techniques applied to thin film materials. Subjects include resistivity, Hall effect, photoconductivity, drift mobility, photoluminescence, capacitance-voltage, deep level transient spectroscopy, optical absorption, IR absorption, and ellipsometry. Students set up and carry out these measurements in the laboratory. *Prerequisite:* MATSE 204, ECE 340, or PHYCS 389, or consent of instructor. 1 unit.

464. Materials Science of Thin Film Growth from the Vapor Phase

Introduction to atomic level processes occurring during vapor phase film growth. Quantitative consideration of growth mechanisms and microstructure evolution of films based on experimental results from atomic level probes, modeling and simulation. *Prerequisite:* MATSE 400, 401, and a graduate course in solid state physics; or equivalent background. Recommended: MATSE 482 or CH E 486. 1 unit.

480. Advanced X-Ray Diffraction

X-ray diffraction as applied to the study of inorganic materials; effects of cold work, annealing, substructures, preferred orientation, and ordering; and principles of electron and neutron diffraction. *Prerequisite:* Consent of instructor. 1 unit.

482. Surface Physics

Same as PHYCS 430. Introduction to theory and experiment of atomic behavior on crystal surfaces; thermodynamics of surfaces; surface

energy; diffraction and structure; gas-solid collisions; Brownian motion, diffusion, and evaporation; electron and ion emission, tunnelling; Van der Waals forces; theory of chemical interactions; and kinetics and statistics of adsorption. *Prerequisite:* MATSE 401 or PHYCS 489, or consent of instructor. 1 unit.

490. Special Topics in Materials Science and Engineering

Structured presentations of new and developing areas of knowledge in materials science and engineering offered by faculty to augment the formal courses available. *Prerequisite:* Graduate standing and consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated including in the same term.

491. Laboratory Investigations in Materials

Special investigations in materials providing an opportunity for instruction in experimental methods of research. *Prerequisite:* Graduate standing and consent of instructor. Available only to nonthesis students enrolled in a Master of Science Program. 0 to 2 units. May be repeated to a maximum of 2 units.

496. Independent Study in Materials Science and Engineering

Individual study of any topic in materials science and engineering under the supervision of a member of the faculty. *Prerequisite:* Graduate standing and consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated in subsequent semesters to a maximum of 1 unit.

497. Research Seminars

Same as CER E 497. Discussions and lectures on current research under the direction of individual staff members. *Prerequisite:* Graduate standing and consent of instructor. 0 or $\frac{1}{4}$ unit. May be repeated.

498. Colloquium on Materials Research

Reviews current materials research in other laboratories by visiting lecturers; also presents some of the research currently done in the department. Required of all graduate students in the department. 0 or $\frac{1}{4}$ unit. Credit earned does not count toward the M.S. or Ph.D. degree.

499. Thesis Research

Individual research in specialized problems under the supervision of members of the staff. Results of research may be used for graduate thesis. 0 to 4 units.

MATHEMATICS

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Mathematics (MATH)

102. Introductory Algebra

Methods of elementary algebra, including simplification of algebraic expressions, solving linear and quadratic equations, equations of lines, systems of linear equations, and radicals. Enrollment is restricted. *Prerequisite:* Score on appropriate placement test, or consent of Mathematics Department. 3 hours. Credit may not be used toward graduation in the College of L A S.

103. Elementary Algebra Review

Review and supplementary material in intermediate algebra in preparation for, or as a supplement to, Algebra (MATH 112). 0 hours. Not intended for credit toward a baccalaureate degree.

104. Trigonometry Tutorial

Trigonometry instruction in small classes as a supplement to MATH 114. *Prerequisite:* Concurrent registration in MATH 114. 0 hours. Not intended for credit toward a baccalaureate degree.

112. Algebra

Rapid review of basic techniques of factoring, rational expressions, equations and inequalities; functions and graphs; exponential and logarithm functions; systems of equations; matrices and determinants; polynomials; and the binomial theorem. Students who need both algebra and trigonometry should enroll in MATH 116. *Prerequisite:* 1½ units of high school algebra, and 1 unit of high school geometry. 3 hours. Credit is not given for both MATH 112 and 116. Credit not applicable toward graduation in certain colleges.

114. Trigonometry

Studies degrees and radians, the trigonometric functions, identities and equations, inverse functions, oblique triangles and applications. Students who need both algebra and trigonometry should enroll in MATH 116. *Prerequisite:* 1½ units of high school algebra, or concurrent registration in MATH 112; 1 unit of high school geometry. 2 hours. Credit is not given for both MATH 114 and 116. Credit not applicable toward graduation in certain colleges.

116. Algebra and Trigonometry

Unified treatment of algebra and trigonometry that combines MATH 112 and 114. Students who need MATH 112 and 114 should enroll in MATH 116. *Prerequisite:* 1½ units of high school algebra; 1 unit of high school geometry. 5 hours. Credit is not given for both MATH 116 and 112. Students with credit in MATH 114 may receive 3 hours credit for MATH 116. Credit not applicable toward graduation in certain colleges.

117. Experimental Mathematics

General education course for students who do not have mathematics as a central part of their curriculum. Laboratory experiments will use computers or calculators to explore mathematical concepts in topics such as arithmetic, calculus, transformational geometry, or numerical methods in mathematical modeling. Priority will be given to students enrolled in

teacher education programs leading to certification in elementary or childhood education. *Prerequisite:* MATH 112. 3 hours.

118. Numeracy

Elementary course for students whose major interests are not in engineering or the physical sciences; emphasizes understanding of mathematical aspects of modern, real-world problems; includes concepts from combinatorics, exponential growth, probability and statistics; problem-solving strategies. *Prerequisite:* Two units of high school algebra. 3 hours.

119. Ideas in Geometry

General education course in mathematics, for students who do not have mathematics as a central part of their studies. The goal is to convey the spirit of mathematical thinking through topics chosen mainly from plane geometry. *Prerequisite:* Two units of high school algebra; 1 unit of high school geometry; or equivalent. 3 hours.

120. Calculus and Analytic Geometry, I

First course in calculus and analytic geometry; basic techniques of differentiation and integration with applications including curve sketching; antidifferentiation, the Riemann integral, fundamental theorem, exponential and circular functions. Students with strong backgrounds in analytic geometry should normally enroll in MATH 135. *Prerequisite:* MATH 116; or MATH 112 and 114; or an adequate mathematics placement test score. 5 hours. Credit is not given for both MATH 120 and either 134, or 135.

124. Finite Mathematics

Introduction to finite mathematics for students in the social sciences; introduces the student to the basic ideas of logic, set theory, probability, vectors and matrices, and Markov chains. Problems are selected from social sciences and business. *Prerequisite:* MATH 112, or an adequate mathematics placement test score. 3 hours.

125. Elementary Linear Algebra with Applications

Basic concepts and techniques of linear algebra; includes systems of linear equations, matrices, determinants, vectors in n -space, and eigenvectors, together with selected applications, such as Markov processes, linear programming, economic models, least squares, and population growth. *Prerequisite:* MATH 112, or an adequate placement test score. 3 hours. Credit is not given for both MATH 125 and 225.

130. Calculus and Analytic Geometry, II

Second course in calculus and analytic geometry; techniques of integration, conic sections, polar coordinates, and infinite series. *Prerequisite:* MATH 120. 3 hours.

134. Calculus for Social Scientists, I

Introduction to the concept of functions and the basic ideas of the calculus. *Prerequisite:* MATH 112. 4 hours. Credit is not given for MATH 134 and MATH 120 or 135.

135. Calculus

First course in calculus differentiation and integration; applications to curve-tracing,

maxima and minima, area, and volume. *Prerequisite:* Completion of a thorough course in plane and solid analytic geometry, or equivalent. 5 hours. Credit is not given for both MATH 135 and 120 or 134.

149. Honors Course in Mathematics

Prerequisite: Concurrent registration in an honors section of MATH 120, 130, 135, 242, or 245; consent of the department. Enrollment is strictly limited to students with superior mathematical talents. 1 hour.

161. Statistics

Same as STAT 100. See STAT 100.

190. Symbolic Computation Lab

Laboratory component to courses using a symbolic programming package. *Prerequisite:* Consent of department; concurrent registration in a designated section of a mathematics course with symbolic computation component. May be taken only once for credit. 1 hour.

198. Freshman Seminar

Guides the student in the study of selected topics not considered in standard courses. *Prerequisite:* Enrollment in the mathematics honors program; consent of department. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

203. Theory of Arithmetic

Analyses the mathematical issues underlying elementary mathematics. Topics include sets, arithmetic algorithms, elementary number theory, rational and irrational numbers, measurement, and probability. There is an emphasis on problem solving. Priority registration will be given to students enrolled in teacher education programs leading to certification in elementary or childhood education. *Prerequisite:* MATH 112 or equivalent. 4 hours.

210. Theory of Interest

Study of compound interest and annuities; applications to problems in finance. *Prerequisite:* MATH 130 or equivalent. 3 hours.

213. Introduction to Discrete Mathematics

Beginning course on discrete mathematics, including sets and relations, functions, basic counting techniques, recurrence relations, graphs and trees, and matrix algebra; emphasis throughout is on algorithms and their efficacy. *Prerequisite:* MATH 120 or 135 or equivalent. Students may not receive credit for both MATH 213 and C S 173. 3 hours.

225. Introductory Matrix Theory

Systems of linear equations, matrices and inverses, determinants, and a glimpse at vector spaces, eigenvalues and eigenvectors. *Prerequisite:* MATH 120 or equivalent. 2 hours. Credit is not given for both MATH 225 and 125. Also, students with earned credit in MATH 315 may not receive additional credit for MATH 225, when 225 is taken after 315.

242. Calculus of Several Variables

Third course in calculus and analytic geometry: three dimensional space, functions of several variables, partial derivatives, and multiple integrals. *Prerequisite:* MATH 130. 3

hours. Credit is not given for both MATH 242 and either MATH 243, 244 or 245.

243. Multivariable Calculus and Vector Analysis

Third course in calculus and analytic geometry including vector analysis: Euclidean space, partial differentiation, multiple integrals, line integrals and surface integrals, the integral theorems of vector calculus. *Prerequisite:* MATH 130. 4 hours. Credit is not given for MATH 243 and either MATH 242, 244, or 245.

244. Calculus for Social Scientists, II

Continuation of MATH 134. Calculus of the trigonometric functions, Taylor polynomials, and infinite series; analytic geometry in n dimensions, vector calculus, classical extremum problems in n variables, and Lagrange multipliers; and multiple integrals. *Prerequisite:* MATH 134 or consent of instructor. 5 hours. Students may not receive credit for both MATH 244 and either MATH 242, 243, or 245.

245. Calculus, II

Continuation of MATH 135. Polar coordinates, vectors and parametric equations, infinite series, functions of several variables, partial derivatives, and multiple integrals. *Prerequisite:* MATH 135. 5 hours. Students may not receive credit for both MATH 245 and either MATH 242, 243, or 244.

247. Fundamental Mathematics

Fundamental ideas used in many areas of mathematics. Topics will include: techniques of proof, mathematical induction, binomial coefficients, rational and irrational numbers, the least upper bound axiom for real numbers, and a rigorous treatment of convergence of sequences and series. This will be supplemented by the instructor from topics available in the various texts. Students will regularly write proofs emphasizing precise reasoning and clear exposition. *Prerequisite:* MATH 130 or 135. 3 hours. (Counts for advanced hours in L.A.S.)

257. Numerical Methods

Same as C S 257. See C S 257.

270. Actuarial Problem Solving

Methods and techniques of solving problems in actuarial mathematics for advanced students intending to enter the actuarial profession. *Prerequisite:* Consent of instructor. 1 to 2 hours. May be repeated to a maximum of 4 hours.

280. Advanced Calculus

Introductory study of vector calculus and functions of several variables; topics include directional derivatives; Jacobians; change of variables in multiple integrals; maxima and minima; line and surface integrals; theorems of Gauss, Green, and Stokes; infinite series; and uniform convergence. *Prerequisite:* MATH 242, or 243, or 245, or equivalent. 3 hours. (Counts for advanced hours in L.A.S.)

285. Differential Equations and Orthogonal Functions

Intended for engineering students and others who require a working knowledge of differential equations; included are techniques and

applications of ordinary differential equations and an introduction to partial differential equations. *Prerequisite:* MATH 242, or 243, or 245, or equivalent. 3 hours. Credit is not given for both MATH 285 and either MATH 286 or 341. (Counts for advanced hours in L.A.S.)

286. Differential Equations with Linear Systems and Orthogonal Functions

Intended for engineering students and others who require a working knowledge of differential equations, included are techniques and applications of ordinary differential equations, linear systems of differential equations, and an introduction to partial differential equations. *Prerequisite:* MATH 242, 243, or 245, or equivalent. 4 hours. Credit not given for MATH 286 and either MATH 285 or 341.

290. Individual Study

Guided individual study of advanced topics not covered in other courses. *Prerequisite:* MATH 347 with grade of B or better, or consent of department. 0 or 2 hours. May be repeated to a maximum of 8 hours.

291. Honors Individual Study

Guided individual study of advanced topics not covered in other courses; for students seeking honors credit. *Prerequisite:* MATH 347 with grade of B or better, or consent of Mathematics Honors Committee. 2 hours. May be repeated to a maximum of 8 hours. (Counts for advanced hours in L.A.S.)

296. Honors Seminar

Careful study of a selected area of mathematics, carried out either deductively from axioms or inductively through problems; subject matter varies with instructor. *Prerequisite:* Consent of Mathematics Honors Committee. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

302. Topics in Geometry

Historical development of geometry; includes tacit assumptions made by Euclid; the discovery of non-Euclidean geometries; geometry as a mathematical structure; and an axiomatic development of plane geometry. *Prerequisite:* MATH 242 or 243 or 245, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

303. Advanced Aspects of Euclidean Geometry

Selected topics from geometry, including the nine-point circle, theorems of Ceva and Menelaus, regular figures, isometries in the plane, ordered and affine geometries, and the inversive plane. *Prerequisite:* MATH 242 or 243 or 245, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

305. Teacher's Course

Presents selected topics in mathematics that are related to the content of secondary school mathematics programs; provides background for enrichment topics for secondary school students. Subject matter varies with the instructor. *Prerequisite:* MATH 242 or 243 or 245, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the

instructor and completion of additional work of substance.

306. History of Calculus

Examination of the historical origins and genesis of the concepts of the calculus; includes mathematical developments from the ancient Greeks to the eighteenth century. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

308. Actuarial Statistics, I

Same as STAT 308. See STAT 308.

309. Actuarial Statistics, II

Same as STAT 309. See STAT 309.

312. Graph Theory and Its Applications

Examines basic concepts and applications of graph theory, where graph refers to a set of vertices and edges that join some pairs of vertices; topics include subgraphs, connectivity, trees, cycles, vertex and edge coloring, planar graphs and their colorings. Draws applications from computer science, operations research, chemistry, the social sciences, and other branches of mathematics, but emphasis is placed on theoretical aspects of graphs. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

313. Combinatorial Mathematics

Same as C S 313. Permutations and combinations, generating functions, recurrence relations, inclusion and exclusion, Polya's theory of counting, and block designs. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

314. Introduction to Mathematical Logic

Introduction to the formalization of mathematics and the study of axiomatic systems; expressive power of logical formulas; detailed treatment of propositional logical and predicate logic; compactness theorem and Godel completeness theorem, with applications to specific mathematical theories; algorithmic aspects of logical formulas. Proofs are emphasized in this course, which can serve as an introduction to abstract mathematics and rigorous proof; some ability to do mathematical reasoning required. *Prerequisite:* MATH 242 or 243 or 245, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

315. Linear Transformations and Matrices

Introductory course emphasizing techniques of linear algebra; topics include matrix operations, determinants, linear equations, vector spaces, linear transformations, eigenvalues, and eigenvectors. *Prerequisite:* MATH 242 or 243 or 245. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

317. Introduction to Abstract Algebra

Introductory course in abstract algebra; includes modular arithmetic, permutations,

group theory through the isomorphism theorems, ring theory through the notions of prime and maximal ideals, and additional topics such as unique factorization domains and classification of groups of small order. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

318. Introduction to Linear Algebra

Abstract approach emphasizing the concept of linear transformations; topics include linear equations, vector spaces, linear transformations, matrices, determinants, invariant subspaces, direct sum decompositions, canonical forms, inner product spaces, and bilinear forms. Emphasizes proofs. *Prerequisite:* MATH 317 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

321. Symbolic Algebra

Introduction to algorithmic, computational algebra. The basic object of study is families of polynomials in several variables with coefficients from a chosen field. The theory and algorithms have applications ranging from highly theoretical results in algebraic geometry to practical questions in applied fields like robotics. *Prerequisite:* MATH 317 or consent of instructor. 4 hours or 1 unit.

323. The Calculus of Curves and Surfaces

Applications of the calculus to the study of the shape and curvature of curves and surfaces; introduction to vector fields, differential forms on Euclidean spaces, and the method of moving frames for low-dimensional differential geometry. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

332. Introduction to Set Theory and Topology

Informal set theory, cardinal and ordinal numbers, and the axiom of choice; topology of metric spaces and introduction to general topological spaces. *Prerequisite:* Credit or concurrent registration in MATH 347. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

339. Philosophy of Mathematics

Same as PHIL 339. See PHIL 339.

341. Differential Equations

Basic course in ordinary differential equations; topics include existence and uniqueness of solutions and the general theory of linear differential equations; treatment is more rigorous than that given in MATH 285. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 341 and 285.

342. Fourier Series and Boundary Value Problems

Introduces students to partial differential equations, emphasizing the wave, diffusion and potential (Laplace) equations. The focus is on understanding the physical meaning and mathematical properties of solutions of partial differential equations. Methods include fundamental solutions and transform methods for problems on the line, and separation of variables using orthogonal series for problems in regions with boundary. Convergence of Fourier series is covered in detail. *Prerequisite:* MATH 285 or 341. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

344. Elementary Real Analysis

Careful treatment of the theoretical aspects of the calculus of functions of a real variable; topics include the real number system, limits, continuity, derivatives, and the Riemann integral. *Prerequisite:* MATH 242 or 243 or 245. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 344 and 347.

346. Complex Variables and Applications

For students who desire a working knowledge of complex variables; covers the standard topics and gives an introduction to integration by residues, the argument principle, conformal maps, and potential fields. Students desiring a systematic development of the foundations of the subject should take MATH 348. *Prerequisite:* MATH 280 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 346 and 348.

347. Introduction to Higher Analysis: Real Variables

Careful development of elementary real analysis including such topics as completeness property of the real number system; basic topological properties of n -dimensional space; convergence of numerical sequences and series of functions; properties of continuous functions; and basic theorems concerning differentiation and Riemann integration. *Prerequisite:* MATH 242 or 243 or 245 or equivalent, and junior standing; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 347 and 344.

348. Introduction to Higher Analysis: Complex Variables

For students who desire a rigorous introduction to the theory of functions of a complex variable; topics include Cauchy's theorem, the residue theorem, the maximum modulus theorem, Laurent series, the fundamental theorem of algebra, and the argument principle. *Prerequisite:* MATH 347. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance. Credit is not given for both MATH 348 and 346.

350. Numerical Analysis: A Comprehensive Introduction

Same as CSE 301, ECE 391 and C S 350. See C S 350.

351. Topics in Applied Mathematics

Deals with topics in the application of mathematics to the physical, biological, and social sciences; see *Timetable* or department office for current topics. *Prerequisite:* Consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit. May be repeated with consent of instructor.

353. Elementary Theory of Numbers

Topics covered include divisibility, primes, congruences, quadratic reciprocity, and Farey sequences. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

355. Numerical Methods for Partial Differential Equations

Same as CSE 311 and C S 355. See C S 355.

358. Numerical Linear Algebra

Same as CSE 312 and C S 358. See C S 358.

359. Numerical Approximation and Ordinary Differential Equations

Same as CSE 313, and C S 359. See C S 359.

361. Introduction to Probability Theory, I

Same as STAT 351. Introduction to mathematical probability; includes the calculus of probability, combinatorial analysis, random variables, expectation, distribution functions, moment-generating functions, and central limit theorem. Prepares students for MATH 366. *Prerequisite:* MATH 242 or 243 or 245, or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

363. Introduction to Mathematical Statistics and Probability, I

Same as STAT 310. See STAT 310.

364. Introduction to Mathematical Statistics and Probability, II

Same as STAT 311. See STAT 311.

365. Analysis of Variance

Same as STAT 324. See STAT 324.

366. Introduction to Probability Theory, II

Same as STAT 356. Continuation of MATH 361. Includes random walks, discrete and continuous time Markov chains, and special topics selected from weak stationarity, the multivariate central limit theorem, probability model building, stochastic equations, martingale theory, and renewal theory. *Prerequisite:* MATH 361 or STAT 311. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

368. Topics in Applied Statistics

Same as STAT 330. See STAT 330.

369. Methods of Applied Statistics

Same as STAT 320. See STAT 320.

370. Actuarial Numerical Analysis

Numerical methods needed in actuarial science including iterative methods of solving equations, interpolation, numerical integration and linear systems. In addition, the theory of finite differences, and applications to actuarial problems will be covered. The level will be consistent with professional examinations in the field. *Prerequisite:* MATH 242 or 243 or 245, MATH 210, and a 100-level computer science course, or consent of instructor. 3 hours, or $\frac{3}{4}$ units. Students may not receive credit for both MATH 370 and C S/MATH 257.

371. Actuarial Theory, I

Distribution of the time-to-death random variable for a single life, and its implications for evaluations of insurance and annuity functions, net premiums, and reserves. *Prerequisite:* MATH 308 and 210. 4 hours or 1 unit.

372. Actuarial Theory, II

Continuation of MATH 371. Emphasis is on multiple-life functions. *Prerequisite:* MATH 371. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

373. Combinatorial Algorithms

Same as CSE 314 and C S 373. See C S 373.

375. Automata, Formal Languages, and Computational Complexity

Same as C S 375. See C S 375.

376. Actuarial Risk Theory

Mathematical analysis of the risk to an insurer due to variations in expected claim numbers and amounts; optimal insurance systems; the probability of ruin in the long run; reinsurance; dividend formulas. *Prerequisite:* Credit or concurrent registration in STAT 309 or 311. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

381. Vector and Tensor Analysis

Vector spaces, transformation properties, covariant and contravariant tensors, and differential geometry of surfaces; applications to relativity theory. *Prerequisite:* MATH 247, 280 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

382. Linear Programming and Combinatorial Optimization

Rigorous introduction to a wide range of topics in optimization, including a thorough treatment of basic ideas of linear programming, with additional topics drawn from numerical considerations, linear complementarity, integer programming and networks, polyhedral methods. *Prerequisite:* MATH 315. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance. Credit is not given for MATH 383 if taken after MATH 382.

383. Linear Programming

Same as C S 383. Systems of linear inequalities, the standard canonical and general linear problems, and the simplex methods of solution. *Prerequisite:* MATH 125, 225, or 315;

or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

384. Nonlinear Programming

Iterative and analytical solutions of constrained and unconstrained problems of optimization; gradient and conjugate gradient solution methods; Newton's method, Lagrange multipliers, duality and the Kuhn-Tucker theorem; and quadratic, convex, and geometric programming. *Prerequisite:* MATH 242 or 243 or 245, and a knowledge of linear algebra equivalent to MATH 315, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

385. Differential Equations, II

Continuation of MATH 285. Linear systems of differential equations, including a self-contained development of the necessary matrix theory; the Laplace transform; and nonlinear differential equations. *Prerequisite:* MATH 285 or 341. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

388. Mathematical Methods in Engineering and Science

Matrices, determinants, bounds and approximations to eigenvalues, introduction to linear operator theory and inner product spaces, orthogonal expansions, and Fourier transforms. *Prerequisite:* MATH 280 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit. One unit credit requires approval of the instructor and completion of additional work of substance.

391. Logic Design

Same as C S and ECE 362. See ECE 362.

393. Statistical Computing

Same as STAT 328. See STAT 328.

394. Time Series Analysis

Same as STAT 329. See STAT 329.

400. Introduction to Graduate Mathematics

Seminar is required of all first-year graduate students in Mathematics. It provides a general introduction to the courses and research work in all of the areas of mathematics that are represented at the University of Illinois at Urbana-Champaign. *Prerequisite:* Graduate standing or consent of instructor. $\frac{1}{4}$ unit. May be repeated in separate semesters to a maximum of $\frac{1}{2}$ unit.

401. Abstract Algebra, I

Isomorphism theorems for groups, centers of p-groups, simplicity of A_n , Jordan-Hölder Theorem; Commutative Rings and Fields, PIDs, UFDs, Gauss's Lemma, splitting fields, Hilbert Basis Theorem, Zariski topology; Modules over Commutative Rings, structure theorem for finitely generated modules over PIDs, with applications to abelian groups and canonical forms for matrices; Zorn's lemma and applications, existence and uniqueness of algebraic closures; Categories and Functors, universal mapping properties, natural transformations, limits and colimits. *Prerequisite:* MATH 317 and 318. 1 unit.

402. Abstract Algebra, II

Solvable groups, finite p-groups, semidirect products, Sylow's theorem; Galois Theory, transcendental extensions, separable and normal extensions, finite Galois groups, Theorem of the Primitive Element, Fundamental Theorem of Galois Theory, symmetric Function Theorem, examples, cyclotomic, cyclic and radical extensions; Modules over Arbitrary Rings, exact sequences, projective and injective modules, Tensor products, Matrix rings, Schur's lemma, Wedderburn's theorem on semisimple rings, group algebras, Maschke's theorem; Algebraic Geometry, varieties, morphisms of varieties, Noetherian properties, Irreducible varieties and prime ideals. *Prerequisite:* MATH 401. 1 unit.

403. Commutative Algebra

Commutative rings and modules, prime ideals, localization, noetherian rings, primary decomposition, integral extensions and Noether normalization, the Nullstellensatz, dimension, flatness, Hensel's lemma, graded rings, Hilbert polynomial, valuations, regular rings, singularities, unique factorization, homological dimension, depth, completion. Possible further topics: smooth and étale extensions, ramification, Cohen-Macaulay modules, complete intersections. *Prerequisite:* MATH 402 or consent of instructor. 1 unit.

404. Group Theory

Structure of groups, derived groups, nilpotence and solvability, and extensions and products. *Prerequisite:* MATH 402 or equivalent. 1 unit.

405. Algebraic Number Theory

Further development of the theory of fields covering topics from valuation theory, ideal theory, units in algebraic number fields, ramification, function fields, and local class field theory. *Prerequisite:* MATH 402 or equivalent. 1 unit.

406. Homological Algebra

Definition and properties of the functors Ext and Tor; projective, injective, and flat modules; group extensions; dimensions of rings, and Hilbert theorem on syzygies. *Prerequisite:* MATH 402 or equivalent. 1 unit.

407. Group Representation Theory

Representation of groups by linear transformations, group algebras, character theory, and modular representations. *Prerequisite:* MATH 402 or equivalent. 1 unit.

408. Lie Algebras

Examples of Lie algebras (low dimensions, Lie algebras of Lie groups, free algebras, and universal enveloping algebra); Poincaré-Birkhoff-Witt theorem; nilpotent and solvable algebras; Cartan subalgebras; structure of semisimple algebras; real forms; and representations. *Prerequisite:* MATH 401; credit or concurrent registration in MATH 402. 1 unit.

409. Noncommutative Rings

Structure of Artinian rings, Morita theory, radicals, Brauer groups, finiteness conditions, and other topics at the choice of the instructor. *Prerequisite:* MATH 402 or consent of instructor. 1 unit.

410. Mathematical Logic

Development of first order predicate logic; completeness theorem; formalized number theory and the Godel incompleteness theorem. *Prerequisite:* MATH 317 or consent of instructor. 1 unit.

411. Model Theory

Techniques for constructing models, including compactness and Lowenheim-Skolem theorems, unions of elementary chains, and omitting types construction; categorical theories; ultraproducts; saturated models; quantifier elimination; applications to algebraically closed fields, real closed fields, and other fundamental structures of mathematics. *Prerequisite:* MATH 410, or consent of instructor. 1 unit.

412. Recursive Function Theory

Various characterizations of the class of recursive (i.e., computable) functions; the Church-Turing thesis; unsolvability of the halting problem; the recursion theorem and the enumeration theorem; relative computability, the jump operation, and the arithmetical hierarchy; recursively enumerable sets; degrees of unsolvability; and the priority method. *Prerequisite:* MATH 410 or consent of instructor. 1 unit.

413. Set Theory

Zermelo-Fraenkel axiomatic set theory; basic concepts in set theory such as ordinal, cardinal, rank, and definition by transfinite recursion; Godel's constructible universe; introduction to forcing; Boolean valued universes; large cardinals; consistency and independence of the continuum hypothesis and the axiom of choice. *Prerequisite:* MATH 410 or consent of instructor. 1 unit.

414. Advanced Topics in Logic

Prerequisite: MATH 410; consent of instructor. 1 unit.

415. Advanced Topics in the Theory of Groups

Prerequisite: Consent of instructor. 1 unit.

416. Advanced Topics in Abstract Algebra

Prerequisite: Consent of instructor. 1 unit.

417. Extremal Graph Theory

Same as CS 472. Extremal problems and parameters for graphs. Distance and connectivity, matching and factors, vertex and edge colorings, perfect and imperfect graphs, intersection classes and intersection parameters, Turan's theorem, graph Ramsey theory, graph decomposition and other extremal problems. *Prerequisite:* MATH 470 or consent of instructor. 1 unit.

418. Structure of Graphs

Structure of graphs and properties of special classes of graphs. Degree sequences and reconstruction, structure of k -connected graphs, Hamiltonian cycles and circumference, planar graphs and their properties, graph minors, cycle coverings, matroidal and algebraic aspects of graphs. *Prerequisite:* MATH 470 or consent of instructor. 1 unit.

420. Computer Algebra Systems

Hands-on exploration of specialized computer algebra systems, their capabilities and applications. Each student will be required to complete an individual project containing original work. *Prerequisite:* MATH 317 or an equivalent course in abstract algebra. 1 unit.

422. Algebraic Geometry

Properties of affine and projective varieties defined over algebraically closed fields; rational mappings, birational geometry and divisors, especially on curves and surfaces; introduction to the language of schemes; and Riemann-Roch theorem for curves. *Prerequisite:* MATH 402. 1 unit.

423. Differentiable Manifolds

Definition and properties of differentiable manifolds and maps, introducing vector fields, tangent bundles, differential forms, exterior derivatives, and foliations. *Prerequisite:* MATH 323 or 381, or consent of instructor. 1 unit.

424. Riemannian Geometry

Local and global properties of Riemannian manifolds. *Prerequisite:* MATH 423. 1 unit.

425. Linear Analysis on Manifolds

Study of topological invariants of differentiable and complex manifolds. *Prerequisite:* MATH 423 and 431, or consent of instructor. 1 unit.

427. Lie Groups

Study of groups which are also differentiable manifolds. *Prerequisite:* MATH 423. 1 unit.

428. Topics in Geometry

Prerequisite: Consent of instructor. 1 unit.

430. Topology

Winding numbers, singular and de Rham homology and cohomology in dimension zero and one, fixed point theorems, Jordan curve theorem, covering spaces, fundamental groups, classification of surfaces, van Kampen Theorem, singular homology, Eilenberg-Steenrod axioms, homology groups of surfaces. *Prerequisite:* MATH 317 and 348 or consent of instructor. 1 unit.

431. Algebraic Topology

CW-complexes, relative homeomorphism theorem, cellular homology, cohomology, Kunnet theorem, Eilenberg-Zilber theorem, cup products, Poincaré duality, examples. *Prerequisite:* MATH 430, 401; or consent of instructor. 1 unit. MATH 402 is recommended but not required.

432. Homotopy Theory

Homotopy groups, fibrations and cofibrations, Hurewicz theorem, obstruction theory, Whitehead theorem and additional topics perhaps drawn from Postnikov towers, Freudenthal suspension theorem, Blakers-Massey theorem, spectra. *Prerequisite:* MATH 431. MATH 402 is recommended but not required. 1 unit.

433. Fiber Spaces and Characteristic Classes

Continuation of MATH 432. Study of fiber bundles and their associated characteristic classes; applications to geometric problems. *Prerequisite:* MATH 432. 1 unit.

434. Geometric Topology

Topics from geometric topology: complexes, cutting and pasting, and other constructions with applications to areas such as manifolds and knots. *Prerequisite:* MATH 430. 1 unit.

435. General Topology

Study of topological spaces and maps, including Cartesian products, identifications, connectedness, compactness, uniform spaces, and function spaces. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

438. Topics in Topology

Prerequisite: Consent of instructor. 1 unit.

440. Theory of Functions of a Complex Variable, I

Topics include the Cauchy theory, harmonic functions, entire and meromorphic functions, and the Riemann mapping theorem. *Prerequisite:* MATH 346 and 347, or MATH 348. 1 unit.

441. Real Analysis, I

Lebesgue measure on the real line; integration and differentiation of real valued functions of a real variable; and additional topics at discretion of instructor. *Prerequisite:* MATH 347 or equivalent. 1 unit. Credit is not given for both MATH 441 and 481.

442. Real Analysis, II

Abstract measure theory; integration on general measure spaces; and introduction to functional analysis. *Prerequisite:* MATH 441. 1 unit.

443. Ordinary Differential Equations

Existence, uniqueness, and continuation of solutions; topics selected from the following: the theory of linear differential operators, Sturm-Liouville theory, stability theory, and qualitative theory of differential equations. *Prerequisite:* MATH 347; a first course in ordinary differential equations. 1 unit.

444. Partial Differential Equations

Basic introduction to the study of partial differential equations; topics include: the Cauchy problem, power-series methods, characteristics, classification, canonical forms, well-posed problems, Riemann's method for hyperbolic equations, the Goursat problem, the wave equation, Sturm-Liouville problems and separation of variables, Fourier series, the heat equation, integral transforms, Laplace's equation, harmonic functions, potential theory, the Dirichlet and Neumann problems, and Green's functions. *Prerequisite:* Consent of instructor. 1 unit.

445. Theory of Functions of a Complex Variable, II

Continuation of MATH 440. Topics include subharmonic functions, Nevanlinna theory, analytic continuation and Riemann surfaces, and univalent functions. *Prerequisite:* MATH 440. 1 unit.

446. Hilbert Spaces

Geometrical properties of Hilbert spaces; linear operators; and the spectral theory for self adjoint and related operators. *Prerequisite:* MATH 442. 1 unit.

448. Harmonic Analysis

Harmonic analysis on the circle, the line, and the integers, i.e., Fourier series and transforms; locally compact Abelian groups; convergence and summability; conjugate functions; Hardy spaces; uniqueness; Tauberian theorems; almost-periodic functions; commutative Banach algebras. *Prerequisite:* MATH 348 and 442; knowledge of Banach spaces. 1 unit.

451. Theory of Probability, I

Same as STAT 451. Mathematical foundations of probability and stochastic processes; probability measures, random variables, distribution functions, convergence theory, the Central Limit Theorem, conditional expectation, and martingale theory. *Prerequisite:* MATH 442 or consent of instructor. 1 unit. Credit is not given for both MATH 451 and either 481 or 482.

452. Theory of Probability, II

Same as STAT 452. Continuation of MATH 451. *Prerequisite:* MATH 451. 1 unit. Credit is not given for both MATH 452 and 482.

453. Analytic Theory of Numbers, I

Problems in number theory treated by methods of analysis; arithmetic functions, Dirichlet series, Riemann zeta function, L-functions, Dirichlet's theorem on primes in progressions, the prime number theorem. *Prerequisite:* MATH 348 and either 317 or 353. 1 unit.

454. Analytic Theory of Numbers, II

Development of themes from MATH 453 and further topics chosen from additive number theory, asymptotic properties of multiplicative functions, circle method, diophantine approximation, lattice point problems, metric theory, modular forms, sieve theory. *Prerequisite:* MATH 453. 1 unit. May be repeated for credit.

455. Methods of Mathematical Physics, I

Course covers several basic mathematical methods of wide use in physics and engineering. Topics will be selected from the following: calculus of variations, Sturm-Liouville theory and eigenvalue problems, Green's functions and generalized functions, Hilbert space techniques. *Prerequisite:* Advanced Calculus. 1 unit.

456. Methods of Mathematical Physics, II

Course covers several basic mathematical methods of wide use in physics and engineering. Topics will be selected from the following: integral equations, spectral theory and Hilbert spaces, inverse spectral theory, soliton and waterwave theory, asymptotic methods. *Prerequisite:* MATH 455 or consent of instructor. 1 unit.

457. Numerical Solution of Ordinary Differential Equations

Same as C S 457. See C S 457.

458. Topics in Numerical Analysis

Same as CSE 413 and C S 458. See C S 458.

459. Asymptotics and Singular Perturbations in Engineering and Physics

Same as NUC E, PHYCS and T A M 459. See T A M 459.

461. Applied Stochastic Processes

Same as STAT 455. Introduction to topics such as spectral analysis, filtering theory, and prediction theory of stationary processes; Markov chains and Markov processes. *Prerequisite:* MATH 346 and 347. 1 unit.

467. Dynamical Systems Theory

Course is an introduction to the study of dynamical systems. Students who intend to do research in nonlinear dynamics are encouraged to take this course. Specific topics will be chosen to illustrate the theory and use of techniques from global analysis and nonlinear dynamics such as (1) discrete dynamical systems, (2) global theory of ordinary differential equations, (3) Hamiltonian systems, (4) KAM theory, (5) bifurcation and stability, (6) Hopf index theory of vector fields, (7) Morse theory of gradient vector fields, (8) Lyapunov theory, (9) infinite dimensional dynamical systems, (10) structural stability. *Prerequisite:* Consent of instructor. 1 unit.

468. Topics in Analysis

Prerequisite: Consent of instructor. 1 unit.

470. Combinatorial Mathematics

Same as C S 471. Fundamental results on core topics of combinatorial mathematics: classical enumeration, basic graph theory, extremal problems on finite sets, probabilistic methods, design theory, discrete optimization. *Prerequisite:* Graduate standing or consent of instructor. 1 unit.

471. Multivariate Analysis

Same as STAT 471. See STAT 471.

472. Special Topics in Actuarial Theory

Selected topics in advanced actuarial science. *Prerequisite:* Consent of instructor. 1 unit. May be repeated once for credit.

473. Partial Orders and Combinatorial Optimization

Combinatorial aspects of partially ordered sets and their relation to optimization problems. Structure of posets and lattices, Dilworth's theorem and generalizations, linear extensions and sorting, dimension of posets, order ideals, extremal set theory, integer programming and minmax relations, matroids and their applications. *Prerequisite:* MATH 470 or consent of instructor. 1 unit.

474. Methods of Combinatorics

Same as C S 475. Combinatorial methods and other mathematical methods for combinatorial problems. Enumeration by bijections and generating functions, probabilistic methods for existence proofs and asymptotic analysis, randomized algorithms, Ramsey's theorem and related topics, combinatorial designs and their applications, geometric problems and methods. *Prerequisite:* MATH 470 or consent of instructor. 1 unit.

475. Topics in Combinatorics

Advanced topics in combinatorics: a more detailed and research-oriented examination of topics covered in MATH 473 or 474. Examples of past or potential topics for the course include combinatorial designs, algebraic combinatorics, polyhedral combinatorics, matroid theory, external set theory, or probabilistic methods.

Prerequisite: MATH 470 or consent of instructor. 1 unit.

476. Coding Theory

Same as C S 477 and ECE 456. See ECE 456.

477. Special Topics in Actuarial Theory

Topics in mathematical theory of actuarial science beyond basic life contingencies, such as graduation of mortality tables, survival models, mathematics of demography. See *Timetable* or department office for current topics. A paper will generally be required. *Prerequisite:* STAT 309 or 311 or equivalent; credit or concurrent registration in MATH 371. 1 unit. May be repeated to a maximum of 2 units.

478. Topics in Statistics

Same as STAT 478. See STAT 478.

479. Computational Complexity

Same as C S 479 and ECE 479. See ECE 479.

480. Optimization by Vector Space Methods

Same as ECE 480. Introduction to normed, Banach, and Hilbert spaces; applications of the projection theorem and the Hahn-Banach Theorem to problems of minimum norm, least squares estimation, mathematical programming, and optimal control; the Kuhn-Tucker Theorem and Pontryagin's maximum principle; and introduction to iterative methods. *Prerequisite:* MATH 315 or 383, and MATH 347 or consent of instructor. 1 unit.

481. Probability and Measure, I

Same as STAT 453. See STAT 453.

482. Probability and Measure, II

Same as STAT 454. See STAT 454.

483. Optimization in Networks

Theory and methods for optimization over directed graphs; paths, cuts, flows, and potentials; matchings; PERT and CPM; max flow, min path, out-of-kilter, Hungarian, and other algorithms; nonlinear cost functionals; painting theory; and existence and duality. *Prerequisite:* MATH 242 or 243 or 245. 1 unit.

484. Conjugate Duality and Optimization

Convex analysis for constrained extremum problems; convex sets, cones, and functions; separation; Fenchel transform; duality correspondences; differential theory; nonlinear programming; sensitivity; and perturbational duality for primal, dual, and Lagrangian problems. *Prerequisite:* MATH 315 and 347, or consent of instructor. 1 unit.

485. Topics in Optimization

May be repeated for credit. *Prerequisite:* Consent of instructor. 1 unit.

486. Parallel Numerical Algorithms

Same as C S 454, and CSE 412. See C S 454.

488. Topics in Applied Mathematics

Prerequisite: Consent of instructor. 1 unit.

490. Reading Course

Prerequisite: Consent of instructor. 1 to 2 units.

491. Literature Seminar in Mathematics

Seminar on topics of current interest in mathematics. Students present seminars and discussions on various topics. See *Timetable* for current topics. Recommended for all Mathematics students. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ unit. May be repeated in the same or subsequent semesters to a maximum of $\frac{1}{2}$ unit.

495. Linear Analysis and Partial Differential Equations

Course will provide students with the basic background in linear analysis associated with partial differential equations. The specific topics chosen will be largely up to the instructor, but will cover such areas as linear partial differential operators, distribution theory and test functions, Fourier transforms, Sobolev spaces, pseudodifferential operators, microlocal analysis, and applications of the above topics. *Prerequisite:* MATH 347, 385 or consent of instructor. 1 unit.

496. Nonlinear Analysis and Partial Differential Equations

Course will provide students with the basic background in nonlinear analysis associated with partial differential equations. The specific topics chosen will be largely up to the instructor, but will cover such areas as existence and uniqueness techniques, nonexistence and finite time blow-up results, hyperbolic conservation laws, weak solutions, stability theory, nonlinear elliptic theory, regularity theory. *Prerequisite:* MATH 495 or consent of instructor. 1 unit.

499. Thesis Research

Prerequisite: Consent of instructor. 0 to 4 units.

MBA PROGRAM ADMINISTRATION

Head of Program: William Bryan
Office Address: 410 David Kinley Hall, 1407 West Gregory Drive, Urbana
Phone: 244-8019
URL: mba.cba.uiuc.edu

MBA Program Administration (MBA)**401. Foundations of Business**

Understanding the business formation process and how to prepare a business plan. Specific learning objectives include: how to plan and run a business from a strategic perspective; planning and measurement of firm resources; the economic theory of the firm; decision making under uncertainty; understanding customer choice; oral presentation; and computer skills. *Prerequisite:* Admission to the Master of Business Administration program or consent of the Dean of the College of Commerce (or the Dean's designee). $2\frac{1}{2}$ units. Students who receive credit for MBA 401 may not

receive credit for the following courses: ACCY 401, B ADM 420, 444, or 472, or ECON 422.

402. Designing and Managing Business Processes

Helps students understand how to design and manage processes to achieve a firm's objectives. Specific learning objectives include: how managers internally allocate tasks; authority and resources to achieve a firm's objectives; how to design and manage the process of effectively producing products and services; how to measure costs and performance of business processes; how to gather, analyze, and communicate data; and how to manage capital resources within a firm. Students will also develop written communication skills. *Prerequisite:* B ADM 401. $2\frac{1}{2}$ units. Students who receive credit for MBA 402 may not receive credit for the following courses: ACCY 403, B ADM 409, 467, or 473, or FIN 451.

403. Managing Stakeholder Relationships in a Changing Environment

Helps students understand how to identify and interact with the firm's stakeholders in a changing environment. Specific topics include: human resource management, capital markets, the macroeconomy and its legal environment. Students will learn how to use communication skills to manage relationships. *Prerequisite:* B ADM 402. 2 units. Students who receive credit for MBA 403 may not receive credit for ECON 423 or B ADM 443.

404. Managing Change

Course considers organizational change and strategic reorientation in the context of managerial challenges presented by issues such as technological development, environmental protection, strategic reorientation, competing for the future, cooperating for strategic implementation, increasingly diverse workforces, and globalization. The emphasis will be on developing personal capabilities to act as a successful agent of change. *Prerequisite:* MBA 403. $\frac{1}{2}$ unit.

405. Topics in Management

Course presents topics important to the study of business management. Examples of topics include: marketing management; international business; strategic thinking, incentives, and information; operations management; financial reporting, financial institutions; decision and risk analysis; information systems. *Prerequisite:* MBA 402. $\frac{1}{2}$ unit. May be repeated in the same or subsequent semesters as topics vary to a maximum of $2\frac{1}{2}$ units.

420. Corporate Strategy and Global Issues in Management

Focuses on key issues in formulating and implementing corporate strategies with an emphasis on the international operations of firms. Issues are approached from the orientation of the general manager, whose job is to diagnose what is critical in complex business situations and find realistic solutions to strategic and organizational problems. Designed to integrate various functional areas and provide a "total business" perspective on issues pertaining to corporate and international strategy. Builds on learning experiences in previous modules, and acts as an integrative

capstone module. *Prerequisite:* Completion of the first year of the Master of Business Administration Program, including MBA 401, 402, 403, 404, and 405. 1 unit.

430. Internship Development Project

Enables students to undertake special projects to gain practical experience in business management. Students who desire a formalized learning experience combination with an internship may undertake the Internship Development Project. In this project, students keep a weekly journal in which they establish four to six personal objectives, and conduct an industry analysis that includes library research and interviews with co-workers and industry analysts. Other responsibilities include analyzing the culture of the company and interviewing managers. Students present their results in written and oral form. Other projects will be designed to meet the learning objectives identified by a student in consultation with a faculty member. All projects will be supervised by a faculty member. If appropriate, the Office for the Study of Business Issues will provide assistance. *Prerequisite:* Completion of first year of Master of Business Administration program. $\frac{1}{2}$ to 2 units. May be repeated in separate semesters to a maximum of 2 units.

431. Special Projects

Individual projects selected by the student in consultation with a faculty member and approved by the executive officer of the program. *Prerequisite:* Completion of first year of Master of Business Administration program. $\frac{1}{2}$ to 2 units. May be repeated in the same or subsequent semesters to a maximum of 3 units.

MECHANICAL AND INDUSTRIAL ENGINEERING

Head of Department: Richard O. Buckius
Department Office: 140 Mechanical Engineering Building, 1206 West Green, Urbana
Phone: 333-1176
URL: www.mie.uiuc.edu

Including Industrial Engineering (I E) and Mechanical Engineering (M E)

Industrial Engineering (I E)

199. Undergraduate Open Seminar
 1 to 5 hours. May be repeated.

210. Introduction to Operations Research
 Introduction to deterministic and stochastic models in operations research. Topics include: linear programming, integer programming, network models and nonlinear programming, review of basic probability, bernoulli processes, markov chains, markov processes and queuing theory. *Prerequisite:* I E 230 or equivalent.

lent and credit or concurrent registration in MATH 315. 4 hours.

230. Analysis of Data

Nature of probabilistic models for observed data; discrete and continuous distribution function models; inferences on universe parameters based on sample values; introduction to control charts, acceptance sampling, and measurement theory. *Prerequisite:* MATH 242. 3 hours.

235. Industrial Quality Control

Contemporary concepts and methods for quality and productivity design and improvement; philosophies of Deming, Taguchi, and others leading the quality management and engineering movement; Shewhart's methods for statistical process control; process capability analysis; statistical methods for tolerance assessment; process control methods employing attribute data; introduction to design of experiments, concepts, and methods. *Prerequisite:* I E 230 or consent of instructor. 3 hours.

240. Human Factors in Human-Machine Systems

Same as AVI and PSYCH 258. See PSYCH 258.

261. Facilities Planning and Design

Reviews the process of facility planning, plant layout design and materials handling analysis; includes the determination of facilities requirements, site selection, materials flow, use of analytical and computerized techniques including simulation, and applications to several areas such as manufacturing, warehousing, and office planning. *Prerequisite:* I E 210 or equivalent. 3 hours.

262. Production Planning and Control

Examines the scope of production systems, and the activities involved in their design, establishment, management, operation, and maintenance; mathematical and computer models for planning and control of facilities, human resources, projects, products, material, and information in production systems. *Prerequisite:* I E 210. 3 hours.

280. Senior Industrial Engineering Design Project

Students are required to solve an actual, real-world design problem. Problems may involve manufacturing, production management, facilities management, or human factors. In solving such a problem, students are required to utilize creative processes and inductive reasoning in engineering design; to develop, evaluate, and recommend alternative solutions to an open-ended design problem; and to satisfy realistic constraints, such as time, cost, and resource availability. *Prerequisite:* Senior standing in Industrial Engineering. Completion or concurrent enrollment in all required I E courses. 3 hours.

291. Seminar

Series of lectures by faculty and invited authorities from the profession concerning the ethics and practices of industrial engineering in their relationship to other fields of engineering, economics, and the problems of society. *Prerequisite:* Junior standing in industrial engineering; must be taken in spring semester. 0 hours.

296. Honors Project

Special project or reading course for James Scholars in engineering. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

297. Honors Seminar

Special lecture sequence and/or discussion groups arranged each semester to bring James Scholars in engineering into direct contact with the various aspects of engineering practice and philosophy. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

306. Stochastic Processes and Their Applications

Modeling and analysis of stochastic processes. Familiarity with discrete-time Markov chains, Poisson processes, and birth- and-death processes is assumed. Topics include the transient and steady-state behavior of continuous-time Markov chains; renewal processes; models of queuing systems (birth- and-death models, embedded-Markov-chain models, queuing networks); reliability models; and inventory models. *Prerequisite:* I E 210 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

309. Optimization of Large-Scale Linear Systems

Practical methods of optimization of large-scale linear systems including extreme point algorithms, duality theory, parametric linear programming, generalized upper bounding technique, price-directive and resource-directive decomposition techniques, Lagrangian duality, Karmarkar's algorithm, applications in engineering systems and use of state-of-the-art computer codes. *Prerequisite:* I E 210 or MATH 383 and MATH 315, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

310. Operations Research Models for Manufacturing Systems

Provides an introduction to the use of operations research techniques to problems in manufacturing and distribution. Topics covered include single and multistage lot sizing problems, scheduling and sequencing problems, and performance evaluation of manufacturing systems. *Prerequisite:* I E 210 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

317. Simulation

Introduction to the use of discrete-event simulation in the modeling and analysis of complex systems using a simulation package. Topics covered: Components of simulation software, including data structures and event-list processing; verification and validation of simulation models; input modeling, including selection of probability distributions and random variate generation; statistical analysis of output data. *Prerequisite:* I E 210 and C S 101 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

334. Introduction to Reliability Engineering

Same as G E 334. Introduction to concepts in engineering design, testing, and management for highly reliable components and systems. *Prerequisite:* I E 230 or MATH 361, or equivalent.

lent with consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

336. Design and Analysis of Experiments

Concepts and methods of design of experiments for quality design, improvement and control; simple comparative experiments, including concepts of randomization and blocking, and analysis of variance techniques; factorial and fractional factorial designs; Taguchi's concepts and methods; second-order designs, response surface methodology. All topics are treated through engineering applications and case studies. *Prerequisite:* One of the following: I E 230, CEE 293, ECE 313, G E 289, STAT 310, MATH 363 or equivalent; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

337. Economic Foundations of Quality Systems

Introduction to total quality systems for planning, developing and manufacturing world-class products. Covers the economic foundations of total quality. Subjects covered include product value, cost, pricing, environmental quality, activity based costing, design for assembly, organization structure, lead time, innovation, Taguchi methods, simulation-based significance testing, Strategic Quality Deployment, statistical process control and conjoint analysis. *Prerequisite:* I E 235 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

342. Interactive Systems Modeling, Analysis, and Design

Same as AVI 342. Analysis and modeling of human-machine interaction in large-scale dynamic systems, development of graphical user interface and interactive real-time simulation environment, human performance evaluation. Utilizes Motif-based user interfaces and the C++ object-oriented programming language. Students work in teams to design, implement, and evaluate graphical interactive simulation environments for complex engineering systems such as manufacturing systems. *Prerequisite:* I E 240 or equivalent, I E 230 or equivalent, and C S 110C or equivalent, or consent of instructor. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit.

346. Human Performance and Engineering Psychology

Same as PSYCH and AVI 356. See PSYCH 356.

348. Human Factors in the Design of Complex Systems

Same as PSYCH 398. Principles of design of Human-Machine Systems. Guidelines for the use of human factors databases and source materials. Use of basic research and theories from behavioral science to design human-machine interfaces. Study of parameters of mental workload and their use in predicting required manning levels. Design of standard and emergency operating procedures. Influences of control room personnel organization and management styles as elements of design. Designing to minimize impact of human error and use of reliability theory of the human element in design. *Prerequisite:* I E 240. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit.

349. Human-Computer Interaction Laboratory

Same as PSYCH and AVI 329. See PSYCH 329.

350. Computer-aided Manufacturing Systems

The application of computer technology and operations research in manufacturing systems; includes the use of minicomputers and microprocessors for direct numeric control of machine tools, adaptive control and optimization, and integrated manufacturing systems; including applications of industrial robots. *Prerequisite:* M E 285 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

355. Numerical Control of Manufacturing Processes

Study of numerical control systems, manufacturing processes, principles and practices basic to numerical control, and programming methodology for numerical control. *Prerequisite:* M E 285 or consent of instructor; background in computer technology. 3 hours, or $\frac{3}{4}$ or 1 unit.

357. Safety Engineering

Study of engineering principles applied to industrial accident prevention; safe plant layout; safety in maintenance; boilers and pressure vessels; design and application of machine guards; material handling and storage; hand and power tools; welding hazards; electrical hazards; flammable liquids and fire protection; industrial health engineering; and toxic materials. *Prerequisite:* Senior standing in engineering or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

366. Knowledge Based Systems in Engineering

Same as M E 366. See M E 366.

393. Special Problems

Study of advanced problems related to industrial engineering. *Prerequisite:* Senior standing or consent of instructor. 1 to 4 hours, or $\frac{1}{2}$ to 1 unit.

401. Mathematical Programming, I: Applied Nonlinear Programming

Optimization of nonlinear systems, including a survey of classical methods and concepts such as the Lagrangian method, the Jacobian method, and Kuhn-Tucker conditions; emphasizes modern algorithms, numerical methods for digital computers, applications in engineering design, and use of state-of-the-art computer codes. *Prerequisite:* IE 210 or equivalent, or consent of instructor. 1 unit.

402. Mathematical Programming, II: Dynamic and Geometric Programming

The formulation and construction of dynamic programming models and advanced dynamic programming concepts such as treatment of multistate variables, nonserial systems, and Markov processes; geometric programming, including treatment of degree of difficulty, mixed signs, and computational refinements; and emphasis on applications in engineering design. *Prerequisite:* STAT 310 and IE 210, or equivalent; or consent of instructor. 1 unit.

403. Integer Programming

Optimization of linear systems involving integer variables and discrete alternatives. Covers: modeling; computational complexity; matroids; branch and bound methods;

Langrangean and Surrogate duality; cutting plane methods and polyhedral theory; and special structured problems such as knapsack, set packing and covering, Traveling Salesman, etc. *Prerequisite:* IE 309 or MATH 382 or equivalent; or consent of instructor. 1 unit.

416. Systems Analysis, I: Systems Methodology and Network Techniques

Same as CEE 416. Study of basic concepts, theories, and techniques of systems analysis, including modeling of large scale systems, forecasting, planning, control, and information handling; emphasizes the modeling of systems with network techniques, including distance, flow, and project networks. Discusses advanced network topics such as out-of-kilter algorithm and project resource analysis. *Prerequisite:* IE 262 or CEE 292, or equivalent, or consent of instructor. 1 unit.

440. Analysis, Modeling, and Design of Man-Machine Systems

Input-output models of man as an information processor, controller, and decision maker are critically evaluated and applied to the analysis and design of specific man-machine systems. Intended for graduate students working in areas of man-machine systems, engineering psychology, control systems, or operations research. *Prerequisite:* M E 240 and IE 230, or equivalent and consent of instructor. 1 unit.

442. Skill, Expertise, and Mental Models in Complex Systems

Same as PSYCH 442. Examines how human expertise develops, particularly in the context of complex industrial systems and various types of professional practice (diagnosis, decision-making, etc.). Topics include: cognitive skill acquisition; how expert knowledge is mentally represented; different knowledge elicitation techniques; and ways of supporting the human expert at work, such as decision support systems and expert systems. *Prerequisite:* At least two of: PSYCH 258, PSYCH 356, PSYCH 329, PSYCH 224, PSYCH 248, and PSYCH 324; or consent of instructor. 1 unit.

448. Cooperative Problem Solving

Same as AVI 448. Advanced graduate seminar on problem solving models and taxonomies, models of coordination of activity and communication among multiple agents, design of human-machine cooperative problem solving systems, adaptive automation and intelligent decision support. Readings drawn from work in pragmatics, distributed artificial intelligence, cognitive engineering, and other related areas. *Prerequisite:* Credit or concurrent registration in one or more of the following: C S 348 or 444, IE 440, PSYCH 427, SPCOM 430 or 437; or consent of instructor. 1 unit.

450. Automated Planning of Manufacturing Processes

Representation of mechanical solids; reasoning about shape of a single solid, manufacturing and design features—representation and recognition; reasoning about multiple solids—machining path generation, assembly sequencing, path planning and obstacle avoidance, task-level robot programming and inspection planning. *Prerequisite:* IE 350 or 355

or consent of instructor and graduate standing. 1 unit.

455. Accuracy, Dynamics, and Control of Machining Systems

Course addresses the problem of modeling machining processes and machine tools. Emphasis is on mechanistic modeling of machining processes, machine-tool errors, characterization of machined surfaces, machine-tool system dynamics and stability and topics in motion control. *Prerequisite:* ME 240 or equivalent course in dynamics and controls; and M E 285 and graduate standing, or consent of instructor. 1 unit.

497. Special Topics in Industrial Engineering

Lectures on special topics in selected areas of industrial engineering. *Prerequisite:* Consent of instructor. 0 to 1 unit. May be repeated to a maximum of 3 units, however no more than 2 units may be within the same semester.

499. Thesis Research

0 to 4 units. May be repeated.

Mechanical Engineering (M E)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

205. Thermodynamics

Introduction to classical thermodynamics through the second law; system and control volume analyses of thermodynamic processes; irreversibility and availability; relations for ideal gas mixtures. *Prerequisite:* MATH 242 or 245. 3 hours.

211. Introductory Gas Dynamics

Introduction to fluid mechanics with coverage of theory and applications of incompressible viscous and inviscid flows, and compressible high speed flows. *Prerequisite:* MATH 285, and credit or concurrent registration in M E 205. 4 hours.

213. Heat Transfer

Principles and application of heat transfer by conduction, convection, and thermal radiation. *Prerequisite:* M E 211 or T A M 235 or equivalent. 4 hours.

231. Engineering Materials

Structures of polymers, metals, and ceramics as the basis for their mechanical behavior. Manipulation of structure through processes such as heat treatment and solidification. Mechanisms of material failure in service (yielding, fracture, fatigue, creep, corrosion, wear) and simple design techniques to avoid these failures. Strategies for material selection in design. *Prerequisite:* T A M 221, CHEM 102, or equivalent. 4 hours. Students may not receive credit for both this course and MATSE 200, T A M 224 or CEE 210. (The latter two courses are cross-listed).

240. Modeling and Analysis of Dynamic Systems

Dynamic modeling of mechanical components and systems; time domain and frequency domain analysis of linear time invari-

ant systems; multidegree-of freedom systems; linearization of nonlinear systems. *Prerequisite:* T A M 212, MATH 285 and concurrent registration in ECE 205 and 206, and MATH 315; or consent of instructor. 3½ hours. Students may not receive credit for this course and any of G E 222 or 224, and A A E 251.

261. Fundamentals of Signal Processing, Instrumentation, and Control

Basic electromechanical techniques used in modern instrumentation and control systems. Use of transducers and actuators. Signal conditioning, grounding, and shielding. Analog and digital signal processing and feedback control methods with emphasis on frequency domain techniques. Frequency response of continuous and discrete systems. *Prerequisite:* M E 240 or equivalent. 3½ hours. Students may not receive credit for both this course and AG E 311.

271. Mechanical Design, I

Kinematics and dynamics of machinery, including analytical kinematics, force analysis, cam design, and balancing. Application of elementary mechanics of solids to analyze and size machine components for stress and deflection. Introduction to finite element analysis with emphasis on beam and plate models. *Prerequisite:* T A M 212 and 221. 3 hours.

272. Mechanical Design, II

Design and analysis of machinery for loadbearing and power transmission. Consideration of material failure modes, including yielding, fracture, fatigue, and creep. Design and selection of machine elements: bolts, springs, rolling element bearings, fluid film lubrication, and power transmissions, including gears and friction drives. *Prerequisite:* M E 231 and 271. 3 hours.

280. Senior Mechanical Engineering Design Project

Students will solve an actual, real-world design problem. In solving such a problem, students are required: to utilize creative processes and inductive reasoning in engineering design; to develop, evaluate, and recommend alternative solutions to an open-ended design problem; and to satisfy realistic constraints, such as time, cost, and material availability. *Prerequisite:* Senior standing in M E; completion of or concurrent enrollment in all required courses; completion of campus Composition I general education requirement. 3 hours.

285. Design for Manufacturability

Introduction to DFM methodologies and tools; quality management (Taguchi, PFD, SPC, etc.); material selection (new and traditional materials); designing for primary manufacturing processes (cutting fundamentals, casting, forming, and shaping); designing with plastics (snap-fits, integral hinges, etc.); design for assembly (DFA); design for inspection and metrology (datums, geometric tolerancing, inspection equipment); computer integrated manufacturing (CIM). 3 hours. Credit or concurrent registration in M E 231.

291. Seminar

Series of lectures by faculty and invited authorities from the profession concerning the ethics and practices of mechanical engineer-

ing in their relationship to other fields of engineering, economics, and the problems of society. *Prerequisite:* Junior standing in mechanical engineering; must be taken in spring semester. 0 hours.

293. Special Projects

Experimental and analytical investigation in mechanical engineering research. *Prerequisite:* Senior standing in mechanical engineering; consent of head of department. 1 to 3 hours. May be repeated; students may register for two different topics in the same semester.

296. Honors Project

Special project or reading course for James Scholars in engineering. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

297. Honors Seminar

Special lecture sequence and/or discussion groups arranged each semester to bring James Scholars in engineering into direct contact with the various aspects of engineering practice and philosophy. *Prerequisite:* James Scholar in engineering; consent of instructor. 1 to 4 hours.

301. Intermediate Thermodynamics

Classical thermodynamics including the Tds equations and the Maxwell relations, development of thermodynamic property relations, P-v-T behavior of real gases, thermodynamics of mixtures, phase equilibrium and chemical reactions and equilibrium with an emphasis on combustion reactions. Statistical thermodynamics including the effect of molecular and atomic structure, statistical concepts and distributions, calculation of thermodynamic properties of gas-phase atoms and molecules, kinetic theory of gases, and an introduction to vibrations in crystals and the electron gas in metals. Selected applications such as the use of statistical thermodynamics in laser spectroscopic analysis of gas phase properties are discussed. *Prerequisite:* M E 205 or a first course in thermodynamics. 4 hours or 1 unit. Students may not receive credit for both M E 301 and any one of the following courses: PHYCS 361, CHEM 342 or 344.

302. Nuclear Power Engineering

Same as NUC E 302. See NUC E 302.

304. Energy Conversion Systems

Analyzes processes and systems for energy conversion, including power and refrigeration cycles, air conditioning, thermoelectrics and fuel cells; ideal gas mixtures and psychometrics. *Prerequisite:* M E 205 or consent of instructor. 3 hours or ¾ unit.

305. Intermediate Gas Dynamics

Solution of internal compressible flow problems by one-dimensional techniques, both steady and unsteady; considers flows with area change (smooth and abrupt), with friction, with heat addition, and with mass addition. Examines flows with weak and strong waves, multiple confined streams, and shock waves. *Prerequisite:* M E 205 and 211, or first course in fluid mechanics. 4 hours or 1 unit.

306. Intermediate Heat Transfer

Conduction heat transfer, radiation heat transfer, mass transfer, phase change, heat exchangers, and introductory numerical methods. *Prerequisite:* Undergraduate courses in fluid mechanics and heat transfer, or consent of instructor. 4 hours or 1 unit.

308. Fluid Mechanics of Convective Heat Transfer

Same as T A M 308. Analyzes viscous flows and heat transfer by convection processes; solution to Navier-Stokes equations for heat conducting laminar and turbulent shear layers; similarity concepts; thermal entry-lengths pipe flows; computer solution techniques. *Prerequisite:* M E 211 or first course in fluid mechanics. 4 hours or 1 unit.

310. Numerical Techniques in Fluid Flow and Heat Transfer

Course discusses numerical techniques for the solution of the equations governing conduction/convective heat transfer and steady/unsteady fluid flows. Emphasis is placed on finite-difference and finite volume techniques. Course presents selected basic algorithms and prepares students to solve real world fluid flow and heat transfer problems. *Prerequisite:* Undergraduate courses in fluid mechanics and heat transfer, or consent of instructor. 3 hours, or ¾ or 1 unit. (For 1 unit credit, graduate students are required to complete an additional project.)

312. Modern Control Theory

The concept of state; state-space representation of systems; transfer function decomposition and state-variable diagrams; state response of continuous and discrete-data systems; determination of the transition matrix; diagonalization; state response of time-varying systems; controllability and observability; stability and Lyapunov's method; and introduction to optimization and design. *Prerequisite:* M E 240 or equivalent, or consent of instructor. 4 hours or 1 unit.

313. Computer Control of Mechanical Engineering Systems

Examines microcomputer control of thermal and mechanical systems: sensing and transducing of variables, transmitting and converting signals, and actuating regulators associated with mechanical engineering systems. *Prerequisite:* M E 261 or AG E 311. 3 hours, or ¾ or 1 unit.

314. Introduction to Tribology

Basic concepts of friction and wear; lubricants and their application; hydrodynamic bearing theory; lubrication requirements and methods; externally pressurized bearings; gas bearings; dynamics and stability of bearings systems; elastohydrodynamic lubrication of rolling element bearings and gears; numerical approaches to lubrication problems. *Prerequisite:* M E 211 or equivalent; or consent of instructor. 4 hours or 1 unit.

315. Tribology

Surface interactions; fundamentals of contact mechanics; friction theories; types and measurement of wear; response of materials to surface tractions; plastic deformation; void

and crack nucleation; crack propagation; delamination wear; microstructural effects in wear process; mechanics of coated surfaces; solid film and boundary liquid film lubrication; friction and wear of polymers and fiber-reinforced polymeric composites; introduction to metal cutting and tool wear; novel methods of improving tribological behavior of sliding surfaces. *Prerequisite:* T A M 221 or equivalent or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

320. Kinematics and Dynamics of Mechanical Systems

Same as AG E 320. Introductory study of the kinematics and dynamics of constrained planar rigid body mechanical systems. Students will learn the underlying theory of modern computer based analysis software packages. *Prerequisite:* M E 271 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

321. Refrigeration and Cryogenics

The theory of operation and the design of equipment for the production of low temperatures from below ambient down to near absolute zero; applications to industrial, consumer, aerospace, medical, and various research uses. *Prerequisite:* M E 205, 211, and 213, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

323. Design of Thermal Systems

Selection of components in fluid- and energy-processing systems to meet system performance requirements; computer-aided design; system simulation; optimization techniques; and investment economics and statistical combinations of operating conditions. *Prerequisite:* Credit or concurrent registration in M E 213. 3 hours, or $\frac{3}{4}$ or 1 unit.

331. Internal Combustion Engines

Study of the fundamental principles underlying the theory and analysis of reciprocating internal combustion engines, fuels, carburetion, combustion, exhaust emissions, detonation, fuel injection, and factors affecting performance; basic laboratory work involving measurements of effects of variables on performance. *Prerequisite:* Credit or concurrent registration in M E 304 or AG E 346, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

336. Automotive Vehicle Dynamics

Introduction to the dynamics and control of automotive multidegree of freedom systems; the development and solution of governing equations for both steady state and transient conditions by computer simulation techniques; investigation of the performance, handling, and safety aspects of vehicles and their interaction with external and internal interfaces; examination of the influence of tires, suspension, steering, and aerodynamic forces; and laboratory experiments and demonstrations. *Prerequisite:* M E 240 or equivalent, or consent of instructor. 3 or 4 hours, or $\frac{3}{4}$ or 1 unit.

345. Introduction to Finite Element Analysis

Same as CSE 351. Applies the finite element method to solve problems from various branches of mechanical engineering; topics include stress analysis, vibration, heat transfer, and fluid flow. *Prerequisite:* C S 101, M E 213,

271, and T A M 221. 3 hours or $\frac{3}{4}$ unit. Credit is not given for more than one of the following: A A E 320, CEE 361, and M E 345.

346. Failure Mechanisms in Engineering Materials

Study of anisotropy of material and elastoplastic properties at crystal level, microstructural basis for fatigue, fracture, and creep in metals, polymers, and ceramics. Failure mechanisms and toughening in composites, structure and behavior of metal matrix composites; ceramic matrix composites and polymer composites. *Prerequisite:* M E 231 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

347. Failure Analysis of Mechanical Components

Examines the relationship of materials and mechanics concepts to the design of structures and components; topics include a brief introduction to elasticity, plasticity theories, thermal loading, creep, fatigue, fracture, and residual life assessments as they relate to materials selection and design. *Prerequisite:* M E 231, 272; M E 346 is recommended but not required. 3 hours, or $\frac{3}{4}$ or 1 unit.

351. Materials Processing

Study of manufacturing processes for metals and polymers. Processing by casting, solidification, polymer molding and extrusion, welding and the application of optical (laser) and electromagnetic energy. Analysis of processes using momentum, heat, and mass transfer. Measurement and instrumentation for materials processing. *Prerequisite:* M E 231 and 213; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. Graduate students who wish to earn 1 unit credit must do all of the standard work as well as complete an additional term project.

366. Knowledge-Based Systems in Engineering

Same as I E 366. Introduction to the concepts of knowledge-based expert systems and their applications to engineering problem solving; introduction to artificial intelligence from engineering automation perspectives; overview of knowledge-based system development practice and tools; discussion of knowledge representations and inference mechanisms; term projects to develop prototype knowledge-based systems for engineering tasks. *Prerequisite:* Senior or graduate standing. 3 hours or 1 unit.

388. Industrial Control Systems

Study of industrial control techniques by case studies of actual industrial systems; provides competence in the design, selection, and maintenance of industrial control systems; and introduces applications to electromechanical, pneumatic, thermal, and hydraulic systems. *Prerequisite:* M E 240 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

393. Special Problems

Study of advanced problems related to mechanical engineering. *Prerequisite:* Senior standing or consent of instructor. 1 to 4 hours, or $\frac{1}{2}$ to 1 unit.

402. Nonequilibrium Multiphase Processes Dynamics and thermodynamics of multiphase and multicomponent systems with special relevance to air pollution control and energy conversion; relaxation phenomena; general motion of systems of disparate elemental masses; diffusion in gravitational and electric fields, and boundary layer motion with mass transport; dispersion and collection of particulate matter; and transport with surface reactions. *Prerequisite:* M E 301 or consent of instructor. 1 unit.

403. Fundamentals of Combustion

Same as A A E 438. See A A E 438.

404. Gas Dynamics, I

Introduction to theoretical gas dynamics; fundamental laws and basic equations for subsonic, transonic, and supersonic steady and unsteady flow processes. *Prerequisite:* M E 305 or equivalent, or consent of instructor. 1 unit.

405. Convective Heat Transfer

Fundamentals of convective heat transfer; calculation of heat transfer within conductor and over submerged objects for laminar and turbulent flow; natural convection; film condensation and boiling; and liquid metals. *Prerequisite:* M E 308 or consent of instructor. 1 unit.

406. Heat Conduction

Fundamentals of heat conduction in isotropic and anisotropic materials; methods of solution to steady and transient heat conduction problems in one, two, and three dimensions; internal heat sources; periodic flow of heat; problems involving phase change; approximate analytical techniques; numerical methods; study of current articles on the subject. *Prerequisite:* M E 306 or consent of instructor. 1 unit.

409. Laboratory Investigations in Mechanical Engineering

Special investigation in flow, metering, heat transfer, and heat exchanger performance and design. *Prerequisite:* Courses in thermodynamics and fluid mechanics. $\frac{1}{2}$ to $1\frac{1}{2}$ units.

410. Thermal Radiation

Fundamentals of radiant energy transport in absorbing and nonabsorbing media; pyrometry; and applications to selected problems involving combined energy transport mechanisms. *Prerequisite:* M E 306 or consent of instructor. 1 unit.

411. Control of Air Pollution from Stationary Sources

Same as CEE 448. See CEE 448.

412. Techniques and Instrumentation in Air Sampling

Same as CEE and ENVST 449. See CEE 449.

414. Advanced Linear Elastodynamics and Vibrations

Same as T A M 414. See T A M 414.

423. Thermal Systems

Steady-state simulation and optimization of thermal systems, dynamic performance, and

probabilities in system design. *Prerequisite:* M E 323. 1 unit.

426. Manufacturing of Advanced Polymer Matrix Composite Materials
Same as A A E and T A M 426. See A A E 426.

433. Gas Turbine Engines

Comprehensive description of gas turbine theory and technology; aerothermodynamics of inlet, compressor, combustor, turbine, and nozzle flows; optimization of performance; and applications to aircraft engines and stationary gas turbine power plants. *Prerequisite:* M E 305 or equivalent. 1 unit.

443. Dynamics of Machinery

Examines generalized equations of motion for single-degree-of-freedom mechanisms; modeling of mechanical systems; dynamics of flexible cam systems; dynamics of rotor systems; dynamics of clutches and brakes; isolation of mechanical vibration and impact; introduction to impact; balancing of machines. *Prerequisite:* T A M 311 or equivalent; consent of instructor. 1 unit.

444. Design and Analysis of Nonlinear Continua with the Finite Element Method
Optimality conditions; finite element methods; design sensitivity analysis; nonlinear analysis; transient analysis; thermo-mechanical solid mechanics. *Prerequisite:* Introductory courses in finite element analysis and in continuum mechanics, or consent of the instructor. 1 unit.

445. Design of Internal Combustion Engines

Comprehensive study of the design of internal combustion engines, including gas forces, inertia loads, bearing analysis, torsional vibration, balance, lubrication, valve and cam design, and stress analysis of major parts of the engine. *Prerequisite:* M E 331 or equivalent, or consent of instructor. 1 unit.

452. Solidification Processing

Same as MATSE and MET E 452. Principles of control of structure, properties, and shape in processes involving liquid/solid transformations; stresses heat flow, mass transport, solute redistribution, nucleation and growth kinetics; and the relationship between process variables and structures and properties in the resultant material. Examples are drawn from existing commercial and new developing processes. *Prerequisite:* M E 351 or consent of instructor. 1 unit.

455. Polymer Rheology and Processing

Continuum models for non-Newtonian fluids; generalized Newtonian, linear viscoelastic and nonlinear viscoelastic models; examines relationship of rheology to processing; considers advanced problems in polymer processing such as numerical simulations of nonisothermal non-Newtonian flows, reactive processing and processing of composites. *Prerequisite:* Consent of instructor. 1 unit.

456. Fatigue Analysis

Examines fatigue analysis methods for the design of structures and components; includes stress life, strain life, and crack propagation

approaches; considers multiaxial and high temperature fatigue; emphasis is placed on the interrelationship between material properties, geometry, and design methodology appropriate for the wide range of mechanical engineering components. *Prerequisite:* M E 346 or consent of instructor. 1 unit.

457. Inelastic Design Methods

Principles of material deformation under combined and thermal loading; constitutive equation applications in engineering design and in inelastic finite element methods; material and structural degradation under fatigue and creep conditions. *Prerequisite:* M E 345 and 346, or consent of instructor. 1 unit.

458. Fracture Resistant Design

Application of fracture mechanics and microstructural behavior to material selection for design; practical approximation of linear and inelastic fracture parameters for evaluation of complex components; destructive and nondestructive tests for control of toughness in manufacture; residual life assessment involving time dependent fracture (creep, fatigue, stress, corrosion); case study and design project oriented. *Prerequisite:* M E 346 or consent of instructor. 1 unit.

468. Modeling and Control of Electro-Mechanical Systems

Same as ECE 468. See ECE 468.

493. Seminar

Required of all graduate students each semester with the exception of doctoral candidates who have passed their preliminary examination. Presentation and discussion of significant developments in mechanical engineering. 0 units.

497. Special Problems in Mechanical Engineering

Lectures, seminars, and individual investigations or studies in selected areas of mechanical engineering. *Prerequisite:* Consent of instructor. 0 to 1 unit. May be repeated.

499. Thesis Research

0 to 4 units.



MEDICAL SCIENCES

Associate Dean of College of Medicine: Susan Kies Roth
College Office: 190 Medical Sciences Building,
506 South Mathews, Urbana
Phone: 333-5469
URL: www.med.uiuc.edu

Medical Sciences (MED 5)

300. Medical Sciences

First-year program in preparation for the M.D. degree involving guided study of gross anatomy, behavioral science, biochemistry,

genetics, immunology, microbiology, neuroscience, embryology, histology, introduction to human disease, medical statistics, and physiology. Elements of clinical experience are monitored and presented by faculty in the clinical and basic medical sciences. *Prerequisite:* Enrollment is limited to students accepted by the College of Medicine. 19 hours (summer session, 9 hours).

301. Medical Sciences and Preclinical Medicine

Second-year program in preparation for the M.D. degree involving classroom and clinical instruction in skills required for acquisition of clinical data base: history and physical diagnosis, principals of diagnostic medical imaging, epidemiology, clinical microbiology, clinical laboratory sciences, clinical tutorials, pathology and pharmacology; and pathophysiological bases of clinical problems. Faculty present and monitor learning experiences, which include lecture/discussion, clinical tutorials, and supervised clinical experiences. *Prerequisite:* Limited to second-year students in the College of Medicine. 19 hours (summer session, 9 hours).

302. Supervised Medical Practice

Third year of preparation for the M.D. degree. Students rotate among affiliated hospitals in internal medicine, family medicine, surgery, obstetrics and gynecology, psychiatry, pediatrics, and other fields and are assigned to patient care teams. Clinical faculty supervise the student experience. Increases students' understanding of the pathophysiological basis of patient problems and teaches patient management skills. *Prerequisite:* Third-year standing in the College of Medicine. 19 hours (summer session, 9 hours).

303. Medical Electives

Fourth year of preparation for the M.D. degree. With approval and guidance of their faculty adviser, students select a program of elective courses which will enhance their clinical skills. These elective courses may be in medicine, surgery, obstetrics and gynecology, pediatrics, family medicine, urology, dermatology, basic science or clinical research, and other fields. A required course, *Medicine and Society*, is also presented. *Prerequisite:* Fourth-year standing in the College of Medicine. 0 to 19 hours (summer session, 0 to 9 hours).

374. General Epidemiology

Same as CHLTH, ENVST, and VP 374. See CHLTH 374.

461. Advanced Clinical Nutrition

Same as NUTRS 461, and FSHN 420. See NUTRS 461.



MEDICAL-SURGICAL NURSING

(See Nursing)

MICROBIOLOGY

Head of Department: John E. Cronan
Department Office: B103 Chemical and Life Sciences Laboratory, 601 South Goodwin Avenue, Urbana
Phone: 333-1737

Microbiology (MCBIO)

100. Introductory Microbiology

Introduction to the principal activities and properties of microorganisms, including bacteria, yeasts, molds, and viruses; consideration of the role of natural processes, such as photosynthesis; and man's use and control of microorganisms in the production of antibodies and vaccines in industrial fermentations, in sanitation and public health, and in agriculture. There are no prerequisites for MCBIO 100, but some chemistry is recommended. 3 hours. Credit is not given for both MCBIO 100 and 200.

101. Introductory Experimental Microbiology

Laboratory introduction to the techniques employed in the investigation of microbial activities and properties; experiments designed to familiarize the student with the handling, identification, and characterization of microorganisms and their activities, particularly those of interest to man. *Prerequisite:* Credit or concurrent registration in MCBIO 100. 2 hours. Credit is not given for both MCBIO 101 and 201.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Microbiology

Emphasizes fundamental concepts of microbiology, including nutrition, ecology, physiology, genetics and molecular biology of microorganisms, and their role in nature and in infection and immunity. *Prerequisite:* Credit or concurrent registration in BIOL 122, or consent of instructor. 3 hours. Credit is not given for both MCBIO 200 and 100. (Counts for advanced hours in L.A.S.)

201. Experimental Microbiology

Laboratory emphasizing the fundamentals of microbiology. Topics include growth, isolation, and identification of bacteria; restriction endonuclease analysis of DNA, genetic cloning, and gene transfer. Computer methods are used for the identification of microorganisms and for the analysis of recombinant DNA molecules. *Prerequisite:* Credit or concurrent registration in MCBIO 200. 3 to 5 hours. Credit is not given for both MCBIO 201 and 101. (Counts for advanced hours in L.A.S.)

290. Research and Special Problems

Prerequisite: Fifteen hours of microbiology; consent of instructor. 1 to 5 hours. May be repeated to a maximum of 10 hours. Majors

in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

292. Senior Thesis

Research under the direction of a senior staff member in microbiology. Normally, the student takes two semesters of MCBIO 292 in the senior year. Recommended for all those planning future research and graduate study; prerequisite for graduation with distinction in microbiology. In the semester preceding initial enrollment, interested students should consult with their advisers concerning the procedures for enrollment. A minimum of 2 hours per senior semester is required, and a thesis must be presented for credit to be received, but graduation with distinction is not an automatic result of enrollment in MCBIO 292. *Prerequisite:* Consent of senior thesis adviser. 2 to 6 hours. May be repeated to a maximum of 10 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

309. Biochemical Basis of Microbial Diversity

Examines the biochemical ecology of diverse microbial groups with emphasis on anaerobic systems. *Prerequisite:* BIOCH 350 or equivalent. 3 hours or ¾ unit.

311. Food and Industrial Microbiology

Same as FSHN 311. See FSHN 311.

312. Techniques of Applied Microbiology

Consideration, through experimentation, of properties of bacteria, yeasts, molds, and actinomycetes important to industrial processes; exploration of methods of control of microbial processes in industry and sanitation. *Prerequisite:* Credit or concurrent registration in MCBIO 311, and consent of instructor. 2 hours or ½ unit.

316. Genetic Analysis of Microorganisms

Prokaryotic and eukaryotic microbial genetic systems; emphasis on typical data analyses, together with the basic classes of genetic phenomena. *Prerequisite:* General genetics, MCBIO 200, or MCBIO 330. 3 hours or ¾ unit.

317. Experimental Techniques in Molecular Genetics

Laboratory emphasizing current molecular genetics techniques in bacteria. Topics include genetic techniques, use of transposons, genetic regulation, nucleic acid hybridization, restriction endonuclease mapping, cloning, and DNA sequencing. *Prerequisite:* MCBIO 201, and credit or concurrent registration in MCBIO 316 or 330; consent of instructor. 5 hours or 1 unit.

326. Biology of Bacterial Pathogens

Emphasizes prokaryotes that cause important diseases in humans and other animals; host-

parasite bacteriology; and chemistry and genetics of mechanisms of pathogenesis. *Prerequisite:* MCBIO 200 or consent of instructor. 3 hours or ¾ unit.

327. Immunochemistry

Study of the field of immunology with emphasis on the chemistry of the proteins and cells involved in the immune response. Lectures and laboratory. *Prerequisite:* Credit or concurrent registration in a biochemistry course, and consent of instructor. 5 hours or 1 unit.

328. Properties of Bacterial Pathogens

Laboratory study of methods of recognition and differentiation, diagnostic tests, and mechanisms of pathogenesis; students are voluntary donors of microorganisms used in experiments. *Prerequisite:* MCBIO 101 or 201; credit or concurrent registration in MCBIO 326 or consent of instructor. 2 hours or ½ unit.

330. Molecular Biology of Microorganisms

Modern contributions to the science of microbiology; emphasizes the structure, function, and synthesis of informational macromolecules and on the role microorganisms have played in molecular biology. *Prerequisite:* MCBIO 200 or equivalent; credit or concurrent registration in a biochemistry course. 3 hours or ¾ unit.

331. Microbial Physiology

Examines bacterial physiology, including discussions of energetics, regulation of metabolism, and cell structure. *Prerequisite:* MCBIO 200 or equivalent; credit or concurrent registration in a biochemistry course. 3 hours or ¾ unit.

332. Genetic Toxicology

Same as CPSC and ENVST 332. See CPSC 332.

340. Computing in Molecular Biology

Examination of computational aspects of biology with an emphasis on the relationships between biological questions and their recastings as mathematical or logical problems. Topics are drawn from biochemistry, genetics, molecular sequence analysis, and molecular structure. *Prerequisite:* Three semesters of college-level biology and calculus (MATH 120, 130, 134, or 135); or consent of instructor. 3 hours or ¾ unit.

351. Molecular Biology of Eukaryotic Viruses

Emphasizes molecular aspects of virology, drawing heavily on animal virus models and focusing on fundamental principles of virus structure, replication, genetics and virus-host interactions that lead to disease development. Stresses both common and unique aspects of strategies employed by the different major families of eukaryotic RNA and DNA viruses and how these lead to acute, persistent or chronic infections, or the development of cancer. *Prerequisite:* Credit or concurrent registration in MCBIO 330 or BIOCH 350; or consent of instructor. 3 hours or ¾ unit.

405. Molecular Genetics: Gene Action

Structure, synthesis, and function of molecules and organelles concerned with the intracellu-

lar transmission of genetic information (including gene regulation, transcription, and translation). *Prerequisite:* MCBIO 316 or 330, and a biochemistry course; or consent of instructor. $\frac{3}{4}$ unit.

411. Molecular Biology of Microbe-Plant Interactions

Same as PL PA 411. See PL PA 411.

412. Advances in Microbiology

Discussions of current research in the following areas of microbiology: (a) general microbiology; (b) microbial physiology and metabolism; (c) immunochemistry; and (d) molecular genetics. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ unit. May be repeated to a maximum of 1 unit.

419. Animal Virology

Same as VP 419. See VP 419.

446. Bacterial Energetics

Same as BIOPH 446. See BIOPH 446.

485. Topics in Microbiology and Molecular Biology

Discussions, reviews, and appraisal of special topics in microbiology and molecular biology; seminar or lecture. Topics do not repeat. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ unit. May be repeated to a maximum of 2 units.

490. Individual Problems

Prerequisite: Consent of instructor. $\frac{1}{4}$ to 4 units. May be repeated. Approved for letter, S/U, and DF grading.

491. Experimental Methods

Laboratory research methods; familiarization of first-year graduate students with experimental methods used in research in microbiology. Required of all first-year students majoring in microbiology. First five weeks of each semester. *Prerequisite:* First-year graduate status and consent of department; concurrent registration in MCBIO 492. $\frac{1}{4}$ unit.

492. Experimental Methods

Laboratory research methods; familiarization of first-year graduate students with experimental methods used in research in microbiology. Required of all first-year students majoring in microbiology. Second five weeks of each semester. *Prerequisite:* First-year graduate status and consent of department; concurrent registration in MCBIO 491. $\frac{1}{4}$ unit.

495. Seminar

Required of all graduate students whose major is microbiology. *Prerequisite:* Ten hours of microbiology; consent of instructor. 0 or $\frac{1}{4}$ unit.

499. Thesis Research

0 to 4 units.

MILITARY SCIENCE

Head of Department: Gerald W. Smith
Department Office: 113 Armory Building, 505 East Armory Avenue, Champaign
Phone: 333-3418
URL: www.uiuc.edu/unit/armyrotc

Note: Students considering enrollment in Military Science, Naval Science, or Air Force Aerospace Studies courses should be aware that University policy prohibits discrimination on the basis of sexual orientation; students may enroll in these courses regardless of sexual orientation. Students seeking to enroll in ROTC are not asked to disclose their sexual orientation. However, homosexual conduct is grounds for disenrollment from the program.

Military Science (MIL S)

111. Introduction to Military Science

Introduction to the aspect of leadership in the military; includes organization, mission and function of the Army, principles of leadership, and tools and techniques for student success while in college. 2 hours.

112. Leadership Laboratory

Introductory practical application of military skills and leadership; includes basic military mountaineering and rappelling, first aid, individual marching and weapons familiarization. Field trip may be required. 0 hours.

113. Map Reading and Land Navigation

Fundamentals of military and USGS map reading including methods such as intersection and resection; includes land navigation and orienteering techniques and their application. Includes field trip. 2 hours.

114. Leadership Laboratory

Continuation of MIL S 112 to include actual firing of weapons. Field trip may be required.

121. Military Mountaineering and Survival

Fundamentals of military mountaineering and survival; to include scaling rock surfaces and rappelling; emplacement of rope bridging; and military survival techniques, to include camouflage and combat lifesaving techniques. Includes field trips. 2 hours.

122. Leadership Laboratory

Intermediate level practical application of military skills and leadership; includes mountaineering and rappelling, first aid, small unit marching, weapons firing, and physical fitness. 0 hours. Field trip required.

123. Military Marksmanship

Fundamentals of rifle marksmanship. Systematic study of the maintenance, operation, and employment of the U. S. Army's primary individual weapon system, the M16 rifle. Also includes instruction on weapons safety, military marksmanship techniques and tactics, an introduction to risk assessment and manage-

ment, and an integration of a live-fire M16 range. Includes field trips. 2 hours.

124. Leadership Laboratory

Continuation of MIL S 122 to include military radio communication procedures and small unit tactics. 0 hours. Field trip required.

231. Military Leadership

Fundamentals of small unit military operations including operations planning, military orders, troop leading procedures, small unit offensive and defensive operations. Includes field practical application. 3 hours.

232. Leadership Laboratory

Advanced level practical application of military skills and leadership with emphasis on the student's ability to direct and supervise others; includes advanced land navigation, advanced first aid, platoon and company drill and ceremonies, and advanced communications procedures. Field trip required. 0 hours.

233. Military Operations and Tactics

Principles of leadership including management practices and their relationship to leadership, problem solving, decision making, human behavior and motivation, superior-subordinate relations, and leadership problems in the military environment. Includes field practical application. 3 hours.

234. Leadership Laboratory

Continuation of MIL S 232 to include small unit tactics and patrolling techniques. 0 hours. Field trip required.

241. Military Law and Professional Ethics

Fundamentals of military law including Law of Land Warfare, the application of federal law to the military, and the military justice system. Examines ethics, values, and professional standards through case studies. Includes introductory instruction on training management. 3 hours.

242. Leadership Laboratory

Unique opportunity for advanced course students to fully plan, execute, and supervise the military training and activities of other military science students. Emphasis is on leadership, organizing and managing activities, decision making, and effective instructional techniques. 0 hours. Field trip required.

243. Military Management Systems

Basic examination of all military management systems: personnel, supply, logistics, training, maintenance, finance, and administration. Includes instruction on military administrative skills—written and verbal communications, meeting management, and briefing techniques. Discusses motivation and counseling techniques. Basic instruction on Army environmental protection policies. 3 hours.

244. Leadership Laboratory

Continuation of MIL S 242. 0 hours. Field trip required.

249. Independent Study

Supervised reading and research in a selected area of Military Science. 1 or 2 hours. May be repeated to a maximum of 2 hours.

MOLECULAR AND CELLULAR BIOLOGY

School Office: 393 Morrill Hall, 505 South Goodwin, Urbana
Phone: 333-3166

Molecular and Cellular Biology (MCB)

150. Molecular and Cellular Basis of Life
Introductory course focusing on the basic structure, metabolic, and molecular processes (including membranes, energy metabolism, genes) common to all cells. Emphasis on unique properties that differentiate the major sub-groups of organisms (archaea, bacteria, plants, and animals), and will discuss how cells are integrated into tissues and organs in multicellular organisms. *4 hours*. Students may not receive credit for MCB 150 and BIOL 120, 121, 122, or 250.

151. Molecular and Cellular Biology Laboratory

Introductory laboratory course focusing on basic techniques in molecular and cellular biology. *Prerequisite*: Concurrent enrollment in MCB 150. *1 hour*. Students majoring in MCB or IB may not receive credit for MCB 151.

250. Molecular Genetics

Genetic variation, gene organization, gene expression, and gene regulation in archae, bacteria, and eukarya. *Prerequisite*: MCB 150 or equivalent or consent of instructor. *3 hours*.

251. Experimental Techniques in Molecular Biology

Laboratory course emphasizing a range of molecular biology questions, and the experimental approaches and methodologies needed to answer these questions. Lectures will accompany labs to explain theoretical background and experimental rationale. *Prerequisite*: Concurrent or prior enrollment in MCB 250 or 254 or consent of the instructor. *2 hours*. Students may not receive credit for this course and MCB 151.

252. Cells, Tissues, and Development

Functional organization and physiology of cells and tissues, including cellular signaling, cellular interactions, and developmental processes. *Prerequisite*: MCB 250 or equivalent with consent of the instructor. *3 hours*.

253. Experimental Techniques in Cell Biology

Laboratory course emphasizing experimental techniques in cellular biology, cellular physiology, and developmental biology. *Prerequisite*: Concurrent or prior enrollment in MCB 252 or consent of the instructor. *2 hours*. Students may not receive credit for this course and MCB 151.

254. Biochemical and Physical Basis of Life
Introduction to biochemistry and structural biology emphasizing the physical and chemical properties of macromolecules. *Prerequisite*: MCB 250 or equivalent or consent of instructor. *3 hours*. (Counts for advanced hours in L.A.S.) Students may not receive credit for both MCB 254 and BIOCH 350.

310. Developmental Biology

Survey of molecular and cellular mechanisms involved in development and growth of animals. Topics to be covered include fertilization and early cell lineage, body axis formation, gastrulation, neural induction and patterning, segmentation, and other aspects of pattern formation including organogenesis of branching organs, limb development and regeneration. *Prerequisite*: CSB 300 and credit or concurrent registration in BIOCH 350 or 353 or MCB 254. *4 hours or 1 unit*.

480. Research Ethics and Responsibilities

Lecture/discussion course focusing on research ethics and a variety of related issues that can influence success in graduate school in the biological sciences, including scientific integrity and compliance with regulations for laboratory research. *Prerequisite*: Consent of instructor. *¼ unit*.

MOLECULAR AND INTEGRATIVE PHYSIOLOGY

Head of Department: Philip M. Best
Department Office: 524 Burrill Hall, 407 South Goodwin Avenue, Urbana
Phone: 333-1735
URL: www.life.uiuc.edu/physiology/home.html

Molecular and Integrative Physiology (PHYSL)

103. Introduction to Human Physiology

Survey of the human body functions and dysfunctions and their underlying molecular, cellular and integrative mechanisms. Offered in two formats: regular (Section B) and self-paced (Section A). In the self-paced format the lecture portion is replaced by intensive, organized readings followed by repeatable quizzes and exams. The course includes a weekly three hour laboratory. *Prerequisite*: high school chemistry and/or basic biology strongly recommended. *4 hours*.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

290. Reading and Individual Topics Course

Readings or laboratory work in fields chosen in consultation with a departmental faculty sponsor. *Prerequisite*: A course in physiology; consent of instructor. *1 to 5 hours*. May be repeated to a maximum of 10 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of ten hours of 290, 292,

and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

292. Senior Thesis

Research in physiology under the direction of a faculty sponsor in the Department of Molecular and Integrative Physiology. A thesis, based on the research, must be submitted by the student and approved by the Physiology Undergraduate Honors Committee in order for him/her to be considered a candidate for graduation with distinction in physiology. *Prerequisite*: Consent of instructor. *2 to 4 hours*. May be repeated to a maximum of eight hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO, PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

295. Special Topics in General Physiology

Selected topics in general physiology. *Prerequisite*: Credit or concurrent registration in PHYSL 301; consent of instructor. *2 hours*. (Counts as advanced hours in L.A.S.)

296. Special Topics in Animal Physiology

Selected topics in animal physiology. *Prerequisite*: Credit or concurrent registration in PHYSL 302; consent of instructor. *2 hours*. (Counts as advanced hours in L.A.S.)

301. Cell and Membrane Physiology

Cellular and molecular basis of physiological processes; emphasis on chemical, physical, and mathematical principles of membrane structure and permeability, nerve conduction, and cell motility. *Prerequisite*: BIOL 122 or 251, or equivalent; one year each of college-level mathematics and physics; chemistry through organic with laboratory. *3 hours or ¾ unit*.

302. Systems and Integrative Physiology

Examines organ physiology of animals; primary emphasis is on the control systems underlying regulation of homeostasis in mammals, including human beings. *Prerequisite*: BIOL 122 or 251, or equivalent; one year college physics; MATH 120 or equivalent; chemistry through organic. *3 hours or ¾ unit*.

303. Cell and Membrane Physiology Laboratory

Introduction to experimentation with cellular functions common to most eukaryotic cells; emphasis on biochemical, radioactive tracer, electrical, and mechanical recording techniques. *Prerequisite*: Credit or concurrent registration in PHYSL 301. *2 hours or ¼ unit*.

304. Systems and Integrative Physiology Laboratory

Introduction to problems and techniques for studying the physiology of organ systems. *Prerequisite*: Credit or concurrent registration in PHYSL 302. *2 hours or ¼ unit*.

305. Principles of Ergonomics

Same as I E and KINES 305. See I E 305.

312. Endocrinology

Physiology and biochemistry of the endocrine system and its hormones with special reference to vertebrates and to human endocrine disorders. *Prerequisite:* PHYSYL 301, BIOL 122 or 251, or a course in biochemistry, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

315. Structure and Function of the Nervous System

Same as CSB 307 and NEURO 315. Examines the structural organization and function of the major systems of the nervous system. Lecture and laboratory. *Prerequisite:* PHYSYL 302, BIOL 303, graduate standing, or consent of instructor. 4 hours or 1 unit.

316. Integrative Neurophysiology

Same as NEURO 316. Advanced studies of single-neuron function and systems neurophysiology. Topics include: ion channels, ionic basis of neural potentials, small neural networks, central pattern generators, neural coding, visual system, auditory system, motor system, sensorimotor integration, learning, and emotion. *Prerequisite:* PHYSYL 302, or BIOL 303 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

317. Methods in Computational Neurobiology

Same as BIOPH and NEURO 317, and BIOEN 376. Application of computer modeling and simulation techniques to the nervous system; Hodgkin-Huxley formalism, single neuron models, central pattern generators, large networks, lateral inhibition, Hopfield models, back-propagation, self-organization and development. Programming assignments and projects to be carried out in scheduled computer laboratory time. *Prerequisite:* CS 110, and PHYSYL 301 or BIOPH 301; or consent of instructor. 4 hours or 1 unit.

341. Comparative Physiology of Animals

Emphasizes comparative aspects of the nervous system and nervous integration; ionic and osmotic regulation in fresh water and marine environments; gas exchange mechanisms; temperature adaptation and endocrine systems in both invertebrates and vertebrates. *Prerequisite:* BIOL 122 or 251, or equivalent; one year of college-level physics; MATH 120; chemistry through organic with laboratory. 3 hours or $\frac{3}{4}$ unit.

342. Advanced Comparative Physiology

Develops competence to read the research literature in selected topics drawn from the comparative study of nervous system, muscle, excretion, metabolism and nutrition, circulation, and regulatory processes. Special emphasis is given to adaptational and evolutionary processes. *Prerequisite:* PHYSYL 341 or concurrent registration. 2 hours or $\frac{1}{2}$ unit.

355. Advanced Cellular and Molecular Physiology

Advanced treatment of cellular and molecular mechanisms common to many physiological processes. Experimental approaches and quantitative treatment of basic physical and chemical principles are emphasized. *Prerequisite:* Concurrent enrollment in PHYSYL 301, or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

356. Advanced Systems and Integrative Physiology

Advanced analysis of the major vertebrate organ systems, including the nervous, circulatory, digestive, renal, respiratory, and endocrine systems. *Prerequisite:* Credit or concurrent enrollment in PHYSYL 302. Physical chemistry and biochemistry are recommended. 2 hours or $\frac{1}{2}$ unit.

404. Physiological Measurements

Same as BIOPH 404. Laboratories concerned with introducing at a graduate level current research techniques in the physiological and biophysical sciences; problem-oriented laboratories; students select up to four special topics representing different areas of physiology and biophysics, such as mammalian and human, molecular, cellular and radiation biology, comparative physiology, and biophysical measurements. Emphasis placed on ability to work independently, and students give written reports of their experiments. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated to a maximum of $1\frac{1}{2}$ units.

405. Neurochemistry

Same as NEURO and PSYCH 405. See PSYCH 405.

409. Faculty Research Topics

Advanced seminars by the faculty on their current research activities. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ unit. May not be repeated for credit.

410. Special Topics in Physiology

Advanced seminars on current topics of interest in physiology. *Prerequisite:* Consent of instructor. 0 or $\frac{1}{4}$ unit. May be repeated to a maximum of 2 units.

412. Advanced Endocrinology

Same as ANSCI and V B 412. Seminar, lectures, student reports, and discussions of recent advances in endocrinology. *Prerequisite:* PHYSYL 312; consent of instructor. $\frac{1}{2}$ unit. May be repeated to a maximum of 2 units.

413. Cardiovascular Physiology

Same as V B 413. See V B 413.

416. Neurophysiology Laboratory

Same as NEURO 416. Neurophysiological techniques and experiments illustrating nerve membrane properties, synaptic action and plasticity, organization and pattern generation in motor systems, and sensory coding in visual and acoustic systems. *Prerequisite:* Credit or concurrent registration in PHYSYL 316 or consent of instructor. $\frac{1}{2}$ unit.

418. Neuroendocrinology

Advanced studies on central nervous system/hormone interaction in vertebrates. Neuroanatomy and maturation of neuroendocrine control systems; production, biochemistry, and physiological effects of neurohormones; and neuroendocrine techniques. *Prerequisite:* PHYSYL 312 and one of the following: PHYSYL 316, 342, or 356; consent of instructor. $\frac{3}{4}$ unit.

430. Reproductive Physiology Seminar

Presentation and discussion of current literature as well as graduate student and staff research proposals and findings in reproductive

physiology. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ unit. May be repeated to a maximum of 1 unit.

431. Advanced Reproductive Endocrinology

Same as ANSCI and V B 431. See ANSCI 431. *Prerequisite:* y

433. Laboratory Methods in Reproductive Physiology

Same as ANSCI and V B 433. See ANSCI 433.

451. Advanced Cellular Physiology

Seminar, lectures, student reports, and discussions. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ unit.

460. Human Pharmacology, I

Studies the general principles of drug action and analyzes the actions of the major drug groups on biochemical and physiological processes. *Prerequisite:* PHYSYL 356; BIOCH 350; consent of instructor. 1 unit.

461. Human Pharmacology, II

Continuation of PHYSYL 460. *Prerequisite:* PHYSYL 460. 1 unit.

490. Individual Topics

For graduate students wishing to study individual problems or topics not assigned in other courses. *Prerequisite:* Approval of department. $\frac{1}{4}$ to 2 units.

491. Artificial Neural Networks and Computational Brain Theory

Same as NEURO 491. See NEURO 491.

499. Thesis Research

Research may be conducted under supervision of the thesis adviser in the following areas: (a) cellular and molecular physiology; (b) comparative physiology; (c) mammalian physiology; (d) human physiology; (e) endocrinology; (f) neurophysiology; (g) radiobiology; and (h) environmental and stress physiology. 0 to 4 units.

MUSIC

Director of School: James C. Scott
 School Office: 3054 Music Building, 1114 West Nevada Street, Urbana
 Phone: 333-2620
 URL: www.music.uiuc.edu/Music

Music (MUSIC)**100. Introduction to Theory and Aural Skills**

Remedial course introducing theory and aural skills. *Prerequisite:* Music major. 2 hours. Credit does not apply to any music degree.

101. Music Theory and Practice, I

Fundamental theory including terminology and notation; visual analysis of music ele-

ments, procedures, and forms; written applications in short projects. Concurrent registration in MUSIC 111 is required. 2 hours.

102. Music Theory and Practice, II

Continuation of MUSIC 101; gradually increased emphasis on aural and visual elements. Concurrent registration in MUSIC 112 is required. *Prerequisite:* MUSIC 101, or placement by examination. 2 hours.

103. Music Theory and Practice, III

Continuation of MUSIC 102; gradually increased emphasis on contrapuntal techniques, dissonance in tonal music, and musical form. Concurrent registration in MUSIC 113 is required. *Prerequisite:* MUSIC 102 and 112, or placement by examination. 2 hours.

104. Music Theory and Practice, IV

Continuation of MUSIC 103; study of twentieth century compositional methods. Concurrent registration in MUSIC 114 is required. *Prerequisite:* MUSIC 103 and 113. 2 hours.

106. Beginning Composition

Music composition in its beginning stages; practice in phrase, section, and short form construction, analysis, and writing; instruction in range, characteristics, and idiom of instruments and voices. *Prerequisite:* Consent of instructor. 2 or 3 hours. May be repeated to a maximum of 6 hours.

110. Introduction to Art Music:

International Perspectives

Surveys the history of European and American art music in an international context; examines major artistic styles, representative composers and works, and their relationship to pertinent non-Western musical traditions and philosophies; reviews fundamental music concepts; strengthens aural analytical skills; familiarizes students with the music library, and research and writing techniques. *Prerequisite:* First-year standing in music or consent of instructor. 2 hours.

111. Aural Skills, I

Beginning aural skills training in the areas of intervals, scales, chords, rhythm, melody, and harmony. Concurrent registration in MUSIC 101 is required. 2 hours.

112. Aural Skills, II

Continuation of aural skills training from MUSIC 101; development of performance, notational, and listening skills in the areas of rhythm, melody, harmony, counterpoint, and formal aspects of musical structure; emphasizes tonal pitch structures. Concurrent registration in MUSIC 102 is required. *Prerequisite:* MUSIC 101 and 111, or placement by examination. 2 hours.

113. Aural Skills, III

Continuation of MUSIC 112; emphasis on extensions of tonality by means of changing tonal centers and altered chords. Concurrent registration in MUSIC 103 is required. *Prerequisite:* MUSIC 102 and 112, or placement by examination. 2 hours.

114. Aural Skills, IV

Continuation of MUSIC 113; emphasis on atonal pitch structures and complex rhythmic

organization. Concurrent registration in MUSIC 104 is required. *Prerequisite:* MUSIC 103 and 113, or placement by examination. 1 hour.

120. Seminar in Music Education

Lecture and performance series in music education. Selected topics and performances focus on trends in music and music education. *Prerequisite:* Music education majors. 0 hours.

130. Introduction to the Art of Music

Provides nonmusic students with basic listening skills, the ability to discuss music intelligently, and an acquaintance with many types of music. 3 hours.

131. Masterworks of Western Music

Studies in detail approximately half a dozen works of different eras and types with regard to form, style, performance practice, and historical significance. 3 hours.

132. The Varieties of Music

Appreciation of a major musical type such as the symphony, the concerto, chamber music, opera, jazz, or popular music. 3 hours.

133. Introduction to World Music

Survey of the musics of Asia, Africa, and Oceania and the native traditions of the Americas. 3 hours.

134. The Eras of Music

Examines major works and composers representative of an era in the history of music such as the baroque, the classical, or the romantic. 3 hours.

140. Introduction to Music Education

Introduces basic issues and principles of music education and teaching with an emphasis on philosophy and the identification of the exceptional child and learning disabilities; includes 16 hours of early field experience in the teaching of music. 2 hours.

142. Elements of Conducting

Fundamentals of conducting, score preparation, and transcription for choral and instrumental ensembles. 2 hours.

143. Pre-Student Teaching Experience

Early field experience in teacher education, including a practicum of observation, teacher aide, and teaching experiences in music. Thirty-two hours of early field experience are required for each 1 hour of credit. 1 or 2 hours. May be repeated to a maximum of 4 hours; only 2 hours may be applied toward the degree.

144. Music Teaching Technique Laboratory

Class and individual instruction on musical instruments and voice for nonmusic majors; serves as a laboratory for undergraduate music education students to teach in their major applied music field. 2 hours. May be repeated to a maximum of 6 hours.

145. Unit One Seminar and Instruction in Music

Experimental seminar courses to introduce nonmusic majors to contemporary ideas in music. 2 hours. May be repeated to a maximum of 4 hours.

150. Jazz Piano Improvisation, I

Study of jazz theory, harmony, and improvisational techniques at the piano; includes experience in solo and ensemble situations, and a historical survey of jazz development from about 1910. *Prerequisite:* MUSIC 162 or equivalent; MUSIC 104 and 114, or equivalent; consent of instructor. 2 hours.

151. Jazz Piano Improvisation, II

Continuation of MUSIC 150. Study of jazz theory, harmony, and improvisational techniques at the piano; includes experience in solo and ensemble situations, and a historical survey of jazz development from about 1910. *Prerequisite:* MUSIC 150, or consent of instructor. 2 hours.

158. Group Instruction in Piano for Nonmusic Majors, I

Beginning piano for nonmusic majors: fundamentals of reading, technique, and creative activities; includes study and performance of simple solo and ensemble repertoire. 2 hours.

159. Group Instruction in Piano for Nonmusic Majors, II

Elementary piano for nonmusic majors. Continuation of basic skills presented in MUSIC 158: reading, technique, creative activities, simple solo and ensemble repertoire. *Prerequisite:* MUSIC 158, or equivalent. 2 hours.

160. Group Instruction in Piano, I

Beginning group instruction in piano for music majors whose principal performing medium is voice, or an orchestral or band instrument; study of simple piano literature, development of skills in technique, sight reading, harmonization, transposition, improvisation, and analysis. 2 hours.

161. Group Instruction in Piano, II

Elementary group instruction in piano for music majors whose principal performing medium is voice, or an orchestral or band instrument; continuation of skills introduced in MUSIC 160; easy solos from the main historical periods with appropriate technical development; introduction to piano ensemble literature. *Prerequisite:* MUSIC 100 or 101, 111; 160 or equivalent; consent of instructor. 2 hours.

162. Group Instruction in Piano, III

Intermediate group instruction in piano for music majors whose principal main performing medium is voice, or an orchestral or band instrument. Continuation of skills introduced in MUSIC 161: study of intermediate level solos and ensemble compositions; harmonization with chromatic chords, sight reading, transposition of four-voice works, improvisation, and learning of patriotic songs. *Prerequisite:* MUSIC 102, 112; 161 or equivalent; consent of instructor. 2 hours.

163. Group Instruction in Piano, IV

Moderately advanced group instruction in piano for music majors whose principal performing medium is voice, or an orchestral or band instrument. Continuation of MUSIC 162: emphasis on solos, ensemble compositions, technical development, and more advanced work in sight reading, harmonization, impro-

visation, transposition, and aural skills. *Prerequisite:* MUSIC 103, 113; 162 or equivalent. 2 hours.

166. English Diction

Phonetics applied to English song literature; individual clinical analysis and practice. To be taken with MUSIC 181. *Prerequisite:* Freshman standing in voice, or consent of instructor. 1 hour.

167. Italian Diction

Phonetics applied to Italian song literature; individual clinical analysis and practice. To be taken with MUSIC 181. *Prerequisite:* Freshman standing in voice, or consent of instructor. 1 hour.

168. German Diction

German pronunciation as applied to German vocal literature; class and individual clinical analysis and practice. To be taken with MUSIC 181. *Prerequisite:* Sophomore standing in voice, or consent of instructor. 1 hour.

169. French Diction

Principles of French pronunciation applied to French vocal literature; class and individual clinical analysis and practice. To be taken with MUSIC 181. *Prerequisite:* At least one semester of French or equivalent required, sophomore standing in voice, or consent of instructor. 1 hour.

170. String Instruments

Class instruction in the fundamentals of playing and teaching violin, viola, cello, and double bass. *Prerequisite:* Enrollment in the School of Music; for nonmusic majors, consent of instructor. 2 hours.

171. Woodwind Instruments

Class instruction in the fundamentals of playing and teaching clarinet, flute, saxophone, oboe, and bassoon. *Prerequisite:* Enrollment in the School of Music; for nonmusic majors, consent of instructor. ½ or 2 hours. May be repeated to a maximum of 5½ hours. Students may also register in this course more than once in the same semester to a maximum of 5½ hours.

172. Brass Instruments

Class instruction in the fundamentals of playing and teaching trumpet, horn, trombone, euphonium, and tuba. *Prerequisite:* Enrollment in the School of Music; for nonmusic majors, consent of instructor. ½ or 2 hours. Students may also register in this course more than once in the same semester to a maximum of 5½ hours.

173. Percussion Instruments

Class instruction in the fundamentals of playing and teaching percussion instruments. *Prerequisite:* Enrollment in the School of Music; for nonmusic majors, consent of instructor. 2 hours.

Note: MUSIC 178 through 198 (applied music) have the following prerequisite: Passing of a performance audition is required prior to the initial registration in any applied music course.

178. Guitar

Instruction in guitar at the undergraduate level, predominantly classical. 2 or 4 hours (summer session, 1 or 2 hours).

179. Harpsichord

Instruction in harpsichord at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

180. Piano

Instruction in piano at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

181. Voice

Instruction in voice at the undergraduate level. 2 or 3 hours (summer session, 1 or 2 hours).

182. Organ

Instruction in organ at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

183. Violin

Instruction in violin at the undergraduate level. Music majors must register concurrently in MUSIC 250. 2 or 4 hours (summer session, 1 or 2 hours).

184. Viola

Instruction in viola at the undergraduate level. Music majors must register concurrently in MUSIC 250. 2 or 4 hours (summer session, 1 or 2 hours).

185. Cello

Instruction in cello at the undergraduate level. Music majors must register concurrently in MUSIC 250. 2 or 4 hours (summer session, 1 or 2 hours).

186. Double Bass

Instruction in double bass at the undergraduate level. Music majors must register concurrently in MUSIC 250. 2 or 4 hours (summer session, 1 or 2 hours).

187. Flute

Instruction in flute at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

188. Clarinet

Instruction in clarinet at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

189. Oboe

Instruction in oboe at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

190. Bassoon

Instruction in bassoon at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

191. Cornet and Trumpet

Instruction in cornet and trumpet at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

192. Horn

Instruction in horn at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

193. Trombone

Instruction in trombone at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

194. Euphonium

Instruction in euphonium at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

195. Tuba

Instruction in tuba at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

196. Percussion

Instruction in percussion at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

197. Harp

Instruction in harp at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

198. Saxophone

Instruction in saxophone at the undergraduate level. 2 or 4 hours (summer session, 1 or 2 hours).

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Instrumentation, I

Basic instrumentation and scoring for small ensembles. *Prerequisite:* MUSIC 102 and 112. 2 hours.

201. Instrumentation, II

Arranging for all wind instruments. Required of composition majors. *Prerequisite:* MUSIC 200, or consent of instructor. 2 hours.

202. Rudiments of Theory, I

Introduces nonmusic majors to basic terminology, notation, concepts of tonality, and musical forms. Nonmusic majors only. 3 hours. (Credit may be received for MUSIC 202 or MUSIC 101, but not for both.)

203. Rudiments of Theory, II

Continuation of MUSIC 202 including study of modulation, chromatic harmony, formal structures, and an introduction to twentieth-century composition. *Prerequisite:* MUSIC 202 or placement by examination; nonmusic majors only. 3 hours. (Credit may be received for MUSIC 203 or MUSIC 102, but not for both.)

204. Compositional Problems: Serial Techniques

Study of serial techniques and levels of determinacy through composition and analysis. *Prerequisite:* MUSIC 104 and 114, or consent of instructor. 2 hours.

205. Compositional Problems: Technological and Visual Aspects

Studies electronic and computer applications, visual and gestural elements, and levels of determinacy through composition and analysis. *Prerequisite:* Consent of composition-theory faculty. 2 hours.

206. Intermediate Composition

Music composition at the secondary stages; analysis and writing of shorter musical forms. *Prerequisite:* MUSIC 106 and consent of composition-theory faculty. 2 hours. May be repeated to a maximum of 6 hours.

210. Introduction to Technology-Based Music Instruction

Hands-on introduction to the development, planning and application of computer, MIDI, multimedia, and electronic communication technologies in music instruction. Instructional implications of the use of technology in the classroom will also be explored. *Prerequisite:* Admission to music education and sophomore standing, or consent of instructor. 2 hours.

211. Practicum in Piano Teaching

Coordinates lesson planning for teaching pre-college piano pupils with extensive teaching experiences; gives close examination to beginning and intermediate teaching literature. *Prerequisite:* MUSIC 143 or 242. 2 hours.

213. The History of Music, I

Survey of music and its development in Western civilization to about 1750; emphasis on an acquaintance with representative musical works and style, and on understanding musical concepts in the light of their historical and general cultural context. *Prerequisite:* MUSIC 110, or consent of instructor. 3 hours.

214. The History of Music, II

Survey of the development of music as an art in Western civilization from about 1750 to the present; emphasizes an acquaintance with formal and stylistic problems through the study of representative works and on understanding specific musical concepts in the light of their historical and general cultural context. *Prerequisite:* MUSIC 213. 3 hours.

229. Thesis and Advanced Undergraduate Honors in Music

Special individual research projects. Required of seniors in the history of music and composition-theory curricula; open also to advanced undergraduates, including James Scholars, who have achieved University or college honors and who desire to do research in specialized areas of music, including performance. *Prerequisite:* Senior standing in the history of music or composition-theory curriculum, or consent of instructor. 2 hours. (Counts for advanced hours in L.A.S.)

230. Choral Literature and Conducting, I

Laboratory course for review and development of conducting skills. Choral repertoire for secondary schools is developed through score analysis and preparation and laboratory conducting assignments. *Prerequisite:* MUSIC 142; concurrent registration in MUSIC 247 for music education majors. 2 hours.

231. Choral Literature and Conducting, II

Laboratory course emphasizing rehearsal techniques, score preparation, and interpretation. Emphasizes the integration of aural, vocal, keyboard, and conducting skills for the choral teacher/conductor. *Prerequisite:* MUSIC 230; concurrent registration in MUSIC 247 for music education majors. 2 hours.

232. Instrumental Literature and Conducting, I

Survey of concert and training literature for wind ensemble and band; refinement of conducting techniques and methods of

teaching through study and performance of selected wind compositions and instructional materials appropriate for public school use. *Prerequisite:* MUSIC 142. 3 hours.

233. Instrumental Literature and Conducting, II

Survey of concert and training literature for orchestra; continued development and refinement of conducting skills and methods of teaching through detailed study and performance of selected compositions and instrumental materials appropriate for public school use. *Prerequisite:* MUSIC 232. 3 hours.

235. Elementary and Junior High School Instrumental Music

Examines pedagogical and organizational techniques for teaching elementary and junior high school instrumental music in a laboratory school setting. *Prerequisite:* MUSIC 232. 2 hours.

239. Principles and Techniques in Music Education

Comprehensive examination of interrelationships among the various segments of music education; the role of music education in the total school program, elementary through secondary, with emphasis upon philosophy, learning theory, curriculum design, identification of exceptional children and learning disabilities, administration, and current trends; includes 20 hours of early field experience in the teaching of music. *Prerequisite:* Senior standing in music education, or consent of instructor, plus 80 hours of early field experiences in the teaching of music. 3 hours.

241. Music for Elementary Teachers

Introduces elementary education students to materials and methods for music teaching in kindergarten through grade six. Classes will include repertoire for various grades along with suggestions for their use, discussion of methods and techniques commonly used in elementary school music programs, and practice for students in simple music teaching skills. Topics include: singing and vocal development, concept development, classroom instruments, correlating music with other subjects, and individualized learning in music. Students will attend at least one music concert performed for elementary school children. 2 hours. Music and music education students may not receive credit for this course.

242. Teaching Music in the Elementary School

Techniques of and material suitable for teaching music in the elementary school. 3 hours.

243. Teaching Music in the Junior High School

Detailed consideration of the music program in the junior high school; special emphasis on instructional material and methods of instruction. 3 hours.

244. Teaching of Instrumental Music

Techniques of teaching, publicizing, organizing, and administering the total school instrument music program, elementary through secondary school. *Prerequisite:* MUSIC 232; senior standing; completion of campus Composition I general education requirement. 3 hours.

245. Music Methods in Early Childhood

Methods for teaching music to children ages 2 through 8, in preschool and early elementary school settings. Includes some observation in preschool settings. Focus on understanding the role of music in early childhood, developing musical concepts, and organizing appropriate learning experiences. 2 hours.

246. Teaching of Choral Music

Methods course providing detailed consideration of organization, development, and maintenance of comprehensive choral program in the secondary schools. *Prerequisite:* MUSIC 231. 3 hours.

247. Repertory for the Secondary School Choral Program

Exploration of literature appropriate for public school music groups through reading and rehearsal demonstrations. *Prerequisite:* MUSIC 142, or consent of instructor. 1 or 2 hours. May be repeated to a maximum of 3 hours.

250. University Orchestra

Prerequisite: Consent of instructor. 0 or 1 hour.

251. Chamber Orchestra

Performs literature of all periods written specifically for a chamber-sized orchestra. *Prerequisite:* Consent of instructor. 0 or 1 hour.

253. Collegium Musicum

Performs medieval, renaissance, and baroque music; various small groups formed for the performance of sonatas and cantatas of Bach and Handel, wind serenades of Mozart, etc. Interested students may play on lute, harpsichord, and other instruments from the University's collection. *Prerequisite:* Consent of instructor. 0 or 1 hour.

254. String Ensemble

Participation in various ensemble groups, such as trios, quartets, quintets, etc., for the study of chamber music literature. The course may be repeated or taken during the freshman and sophomore year without credit. *Prerequisite:* Consent of instructor. 0 or 1 hour.

255. Woodwind Ensemble

Prerequisite: Consent of instructor. 0 or 1 hour.

256. Brass Ensemble

Ensembles of mixed brasses in both small and large forms. *Prerequisite:* Consent of instructor. 0 or 1 hour.

257. Percussion Ensemble

Prerequisite: Consent of instructor. 0 or 1 hour.

258. Piano Ensemble

Prerequisite: Consent of instructor. 0 or 1 hour.

259. Organ Keyboard Techniques

Development of practical keyboard skills related to the work of the church organist: transposition, score-reading, harmonization, modulation, hymn-playing, and solo and anthem accompaniment. *Prerequisite:* Consent of instructor. 1 hour.

260. Oratorio Society

Performance of oratorios and other major choral works in cooperation with the University

Symphony Orchestra; an advanced mixed-voice chorus open to students, faculty, and members of the community. *Prerequisite:* Consent of instructor. 0 or 1 hour.

261. University Chorus

Performance of cantatas and other choral works; a mixed-voice chorus for average and beginning singers. Open to students, faculty, and members of the community. *Prerequisite:* Consent of instructor. 0 or 1 hour.

262. Women's Glee Club

Practical experience in the rehearsal and public performance of choral music of various periods and styles. Open to all women students. *Prerequisite:* Consent of instructor. 0 or 1 hour.

263. Men's Glee Club

Practical experience in the rehearsal and public performance of choral music of various periods and styles. Open to all men students. *Prerequisite:* Consent of instructor. 0 or 1 hour.

264. Concert Choir

Practical experience in mixed-voice singing of accompanied and unaccompanied music of various periods and styles; a highly advanced group of competent student singers. *Prerequisite:* Consent of instructor. 0 or 1 hour.

265. Opera-Musical Theatre

Preparation and public performance of grand or light opera; includes only singing and acting. (Students desiring experience in costuming, stage management, scenery, publicity, etc., should apply to the University Theatre which cooperates in the opera productions). *Prerequisite:* Consent of instructor. 0 or 1 hour.

266. Jazz Band

Designed to acquaint proficient instrumentalists with jazz compositions, arrangements, and improvisational procedures, and to promote a high degree of stylistic and technical competence in performance. *Prerequisite:* Consent of instructor. 0 or 1 hour.

267. Harp Ensemble

Ensembles of multiple harps and harp in combination with other instruments. *Prerequisite:* Consent of instructor, or MUSIC 197 or 397. 0 or 1 hour.

268. Small Choral Ensembles

Open to a limited number of undergraduate students who desire experience in performance of music specifically written for smaller choral groups. *Prerequisite:* Consent of instructor. 0 or 1 hour.

269. String Chamber Music, Literature and Performance

Extensive study of chamber music literature for or including string instruments (violin, viola, cello, double bass). Students will be assigned to chamber groups which will be coached on a weekly basis by members of the string faculty. One performance per semester will be required. *Prerequisite:* Junior standing in Instrumental Music (String Instrument Majors), or consent of instructor. 1 hour. May be repeated to a maximum of 8 hours.

270. String Pedagogy for the Public School Teacher

Organization, materials, and techniques for the teaching of strings in the public school string class. *Prerequisite:* String major, or consent of instructor. 3 hours.

271. Ethnomusicology Performance Ensembles

Instruction and experience in the performance of various non-Western and vernacular music traditions such as Javanese gamelan, African mbira, Andean panpipes, North American stringband, and European traditional music. Topics vary according to available instructors. *Prerequisite:* Consent of instructor required. 0 to 1 hour. May be repeated in the same semester to a maximum of 2 hours. May be repeated in subsequent semesters to a maximum of 8 hours.

Note: MUSIC 281-290 are open to all students who have been accepted by audition, with assignments made according to proficiency and instrumentation. Completion of each course involves, in addition to the regular schedule of rehearsals, participation in public appearances by the bands.

281. Symphonic Band, I

Maintains a complete symphonic band instrumentation for the study and performance of all types of band literature. 0 or 1 hour.

282. Symphonic Band, II

Maintains a complete symphonic band instrumentation for the study and performance of all types of band literature. 0 or 1 hour.

283. First Concert Band

Maintains the instrumentation of the standard band, and serves as a training organization for the symphonic bands. The literature studied and performed is of the highest calibre and technical difficulty. 0 or 1 hour.

284. Second Concert Band—A

Training for the Symphonic Bands and the First Concert Band. The high quality band literature is technically less difficult than that of MUSIC 281, 282, and 283. Promotion contingent upon improvement and chair vacancies. 0 or 1 hour.

285. Second Concert Band—B

Training for the Symphonic Bands and the First Concert Band. The high quality band literature is technically less difficult than that of MUSIC 281, 282, and 283. Promotion contingent upon improvement and chair vacancies. 0 or 1 hour.

286. Marching Band

Prepares and performs at least six shows per football season; music used is of the highest available quality. 1 hour.

287. Basketball Band

Performs for home basketball games. *Prerequisite:* Band Department audition during early November. 1 hour. Credit is given for spring semester only.

288. Brass Band

Maintains a complete British Brass Band instrumentation for the study and performance of all types and styles of brass band literature. *Prerequisite:* Concurrent registration in MUSIC 281, 282, 283, 284, or 285. 0 or 1 hour.

289. Summer Band

Maintains the instrumentation of the standard band for the study and performance of all types of band literature. *Prerequisite:* Consent of instructor. 0 or 1 hour.

290. Clarinet Choir

Maintains a complete clarinet choir instrumentation for the study and performance of all types and styles of clarinet choir literature. *Prerequisite:* Concurrent registration in MUSIC 281, 282, 283, 284, or 285. 0 or 1 hour.

300. Counterpoint and Fugue

Study of contrapuntal writing and analysis. *Prerequisite:* MUSIC 104 and 114, or consent of instructor. 3 hours or ½ unit.

301. Schenkerian Analysis of Tonal Music

Studies analytical systems and their application to tonal music; includes a survey of theoretical works by important theorists from Rameau to Schenker. Emphasizes practical application of Schenkerian analysis. *Prerequisite:* MUSIC 104, or consent of instructor. 3 hours or ¾ unit.

302. Musical Acoustics

Theory and application of simple resonators, wave motion, resonances of string and pipes; perception of loudness, pitch and timbre; musical scales; and acoustics of rooms and musical instruments. *Prerequisite:* MATH 112 and MUSIC 101 or equivalent. 3 hours or ¾ unit.

303. Music Formalization

Surveys the logical tools introduced in the theory and practice of the musical composition by Xenakis, Hiller, and others; intended for musicians with no more than limited familiarity with mathematics. *Prerequisite:* MUSIC 104 and consent of instructor. 3 hours or ¾ unit.

304. Contemporary Compositional Techniques

Studies in specialized areas of composition for advanced undergraduates and graduates majoring in composition-theory. May be elected by others with consent of instructor. *Prerequisite:* MUSIC 104, 106, 114, or consent of instructor. 2 hours or ½ unit. May be repeated to a maximum of 6 hours or 1½ units.

305. Analytical Systems for Twentieth-Century Music

Study of various analytical techniques developed for music written in the twentieth century based on compositional procedures other than those derived from the common practice period. *Prerequisite:* MUSIC 104 and 109, or consent of instructor. 3 hours or ¾ unit.

306. Composition

Work in original composition including small and large forms. Students submit scores of their compositions to the composition faculty

in order to obtain consent to register; consent is granted on the basis of the quality of the music the student has composed and the level of skill demonstrated in the work submitted. *Prerequisite:* For undergraduates, MUSIC 204, 205, and 206 and consent of composition faculty; for graduate students, consent of composition faculty. *3 hours or 1/2 unit.*

308. Analysis of Musical Form

Extensive study of the formal structure of representative musical compositions from various historical periods: (a) renaissance and baroque; (b) Viennese classical; (c) nineteenth century; (d) first half of twentieth century; and (e) since World War II. *Prerequisite:* MUSIC 104 and 114. *3 hours or 1/2 unit.* May be repeated to a maximum of 9 hours or 1 1/2 units.

310. Ancient and Medieval Music

History of Western music to about 1400. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

311. Music in the Renaissance

History of music from about 1400 to 1600. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

312. Music of the Seventeenth Century

History of music from about 1600 to 1700. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

313. Music of the Eighteenth Century

History of music from about 1700 to 1800. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

314. Music of the Nineteenth Century

History of music from about 1800 to 1900. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

315. Music of the Twentieth Century

History of music from about 1900 to the present. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

316. Anthropology of Music

Same as ANTH 316. Introduction to the anthropological study of music, including the role of music in the world's societies and non-Western musical systems and cultures. *Prerequisite:* ANTH 103 or 110, or consent of instructor. *3 hours or 3/4 unit.*

317. Area Studies in Ethnomusicology

Same as ANTH 315. Seminar devoted to intensive study in the music of one specific culture, e. g., Japan, China, Indonesia, India, the Near East, African and New World Negro, European and American folk cultures, or American Indian. *Prerequisite:* Senior standing in music, or consent of instructor. *3 hours or 3/4 unit.* May be repeated to a maximum of 12 hours or 2 units.

320. Proseminar

Special preparation in specialized fields of musicology, composition-theory, and music education. *Prerequisite:* Senior or graduate standing in music or music education; consent of instructor. *1 to 4 hours or 1/4 to 1 units.* May be repeated to a maximum of 8 hours or 2

units. Students in open studies may repeat to a maximum of 16 hours.

321. Electronic Music Techniques, I

Introduces electro-acoustic music, including historical background, literature, techniques of notation and realization, and compositional application in the areas of musique concrete, classical electronic music, and voltage-controlled electronic music. *Prerequisite:* Junior standing in music, or consent of instructor. *4 hours or 1 unit.*

322. Electronic Music Techniques, II

Advanced study in the use of voltage-controlled synthesizers in music composition and study of compositional, technical, and performance considerations in combining electronics with traditional instruments and/or voices in music composition. *Prerequisite:* MUSIC 321, or placement by examination. *2 hours or 1/2 unit.*

323. Opera Production, I

Studies the problems of the lyric stage; investigation of and practice with casting methods, program selection, production procedures, stage direction, coaching methods, and opera dramatics. *Prerequisite:* MUSIC 265 and 381; consent of instructor. *3 hours or 1/2 unit.* May be repeated to a maximum of 6 hours or 1 unit.

324. Opera Production, II

Continuation of topics introduced in MUSIC 323. *Prerequisite:* MUSIC 323. *3 hours or 1/2 unit.* May be repeated to a maximum of 6 hours or 1 unit.

328. Composer-Choreographer Workshop

Same as DANCE 328. See DANCE 328.

330. Applied Music Pedagogy

Survey of techniques, practices, and materials; presentation of group and individual instruction; an approach to teaching problems, tone production, musical styles, and interpretation for various age levels; actual teaching experience under faculty supervision. Required of applied music majors in voice and string instruments. *Prerequisite:* Junior standing in music, or consent of instructor. *2 hours or 1/2 unit.* May be repeated to a maximum of 4 hours or 1 unit.

331. Piano Pedagogy, I

Objectives, techniques, literature, and materials for teaching the child from about ages five through ten (elementary level); observation of lessons and supervised student teaching experience. *Prerequisite:* Senior standing in music or music education, or consent of instructor. *2 hours or 1/2 unit.*

332. Piano Pedagogy, II

Objectives, techniques, literature, and materials for teaching the young pianist from about ages eleven through eighteen (middle school to pre-college level); teaching the adult beginner; observation of lessons and supervised student teaching experience. *Prerequisite:* Senior standing in music or music education, or consent of instructor. *2 hours or 1/2 unit.*

333. The History of Opera

Surveys opera and related forms from the end of the 16th century to the present; studies rep-

resentative works in some detail. *Prerequisite:* MUSIC 214, or consent of instructor. *3 hours or 3/4 unit.*

335. The Music of America, II

Study of chamber, choral, and orchestral music written by American composers from about 1850 to the present; jazz and its offshoots; folk and popular music; and experimental music in America. *Prerequisite:* Senior standing in music, or consent of instructor. *3 hours or 3/4 unit.*

337. National and Regional Studies in European Music History

Studies in the history of music of individual nations and regions of Europe. Each semester is devoted to one area, such as Great Britain, Spain and Portugal, Russia, Scandinavia, or eastern Europe. *Prerequisite:* Junior standing in music, or consent of instructor. *3 hours or 3/4 unit.* May be repeated to a maximum of 6 hours or 1 1/2 units.

338. Trends in Elementary School Music: Kodály and Orff

Investigation of Kodály, Orff, and other approaches to elementary school music, including philosophy, pedagogy, musical materials, and applicability to North American teaching settings. *Prerequisite:* MUSIC 242, or consent of instructor. *2 hours or 1/2 unit.*

339. Music and the Special Learner

Introduction to the role of music in the education of the special learner, including the history and major issues of special education, consideration of characteristics of exceptional students, and development/adaptation of curricular and instructional approaches designed to guide the musical development of the special learner. *Prerequisite:* Graduate or upper-level undergraduate standing in music education, or consent of instructor. *3 hours or 3/4 unit.*

340. Marching Band Procedures

Detailed consideration of principles and procedures for preparing a marching band to participate in parades, ceremonies, and shows for sports events. *Prerequisite:* Junior standing in instrumental music education. *2 hours or 1/2 unit.*

341. Seminar in Instrumental Music Education

Intensive study of musical, acoustical, and educational concepts and principles related to the teaching of instrumental music in elementary and secondary schools. *Prerequisite:* Completion of student teaching, or graduate standing in music education. *2 hours or 1/2 unit.*

342. Band Arranging

Development of basic scoring and arranging skills for various small instrumental ensembles and marching band. *Prerequisite:* MUSIC 104, or equivalent. *2 hours or 1/2 unit.*

343. Tests and Measurement in Music Education

Construction, design, appraisal, and use of measurement devices for music teaching and research. *Prerequisite:* Consent of instructor. *2 or 4 hours, or 1/2 or 1 unit.*

344. Jazz Ensemble Rehearsal Techniques

Emphasizes principles of interpretation and techniques for conducting the school jazz ensemble through detailed study, with practicum experience in a laboratory setting. *Prerequisite:* MUSIC 232, or consent of instructor. 2 hours or ½ unit. Graduate credit requires written project.

345. Teaching Techniques of Music Theory

Analysis and discussion of teaching materials, methods, texts, and pedagogical sequence, including an intensive survey of aural and theoretical skills covered during the first two years of collegiate study. *Prerequisite:* MUSIC 300, or consent of instructor. 2 hours or ½ unit.

346. Workshop in Music Education

Development of essential facts, attitudes, and principles through a consideration of problems encountered in music education. Parallel with this study is the preparation of resource materials for music programs in elementary and secondary schools. 1 to 4 hours, or ¼ to 1 unit. May be repeated to a maximum of 2 units. Offered during the summer session only.

349. Music in Early Childhood

Same as HDFS 349. Detailed consideration of the music program in nursery schools, kindergarten, and the primary grades; topics include the nature of early musical responses, objectives, experience levels of the program, methods of teaching, and materials. Observation of music teaching at the Child Development Laboratory is included in the course work. *Prerequisite:* Senior or graduate standing in music or human resources and family studies, or consent of instructor. 2 hours or ½ unit.

350. Advanced Ensemble Music

Selected projects in the study and performance of ensemble literature, including the areas of operatic, instrumental, and vocal-choral music and accompanying. *Prerequisite:* Consent of instructor. 0 to 2 hours, or 0 to ½ unit.

353. Introduction to Research in Music Education

Emphasizes the interpretation and application of published studies and reports, an overview of traditional research methodologies, sources of research literature, basic statistical procedures, and quantitative and qualitative research terminology. *Prerequisite:* Advanced undergraduate or graduate standing in Music or Music Education, or consent of instructor. 2 hours, or ½ or 1 unit.

355. School/Community Musical Theatre Production

Problems and techniques involved with technical and artistic production of musicals in the junior and senior high schools and in the community. *Prerequisite:* Advanced undergraduate or graduate standing in music education or performance curricula, or consent of instructor. 2 hours or ½ unit.

358. Technology-Based Music Instruction

Detailed study of the role of technology in music instruction. Students will evaluate hardware and software, build multimedia applications, explore music resources on the

Internet and work with MIDI technology. Course is geared to today's music educator who needs to adapt to a continually evolving instructional environment. Includes an in-depth analysis of the philosophical and instructional implications of technology. *Prerequisite:* MUSIC 210 or consent of instructor. 2 or 4 hours, or ½ or 1 unit.

360. Advanced Keyboard Skills, I

Comprehensive keyboard musicianship course for advanced pianists emphasizing the development of the following skills: sight reading, harmonization, transposition, improvisation, playing by ear, and vocal and instrumental score reading. Ensemble piano music is performed. *Prerequisite:* MUSIC 180 (12 hours completed) or MUSIC 163; and MUSIC 104 and 114 or equivalent; and consent of instructor. 2 hours or ½ unit.

361. Advanced Keyboard Skills, II

Continuation of the topics introduced in MUSIC 360. *Prerequisite:* MUSIC 180 (12 hours completed) or MUSIC 163; MUSIC 104 and 114 or equivalent; MUSIC 360 or equivalent; and consent of instructor. 2 hours or ½ unit.

362. Advanced Jazz Piano Improvisation

Study of solo jazz piano improvisation on an advanced level. Includes practical experience in traditional, modern, and abstract solo performance, as well as theoretical, stylistic, and historical background. *Prerequisite:* MUSIC 151 or equivalent. 2 hours or ½ unit. May be repeated to a maximum of 4 hours or 1 unit.

364. Jazz Pedagogy at the Keyboard

Designed for future piano teachers and involves evaluating and designing of teaching strategies for significant repertoire in the jazz idiom at elementary, intermediate, and advanced levels of instruction. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

366. Vocal Repertoire, I

Study of the standard solo literature, including solo excerpts from larger works, i.e., cantata, oratorio, and opera; supplements the student's knowledge of the literature in his/her special field. *Prerequisite:* Junior standing in voice, or consent of instructor and concurrent registration in MUSIC 381. 1 hour.

367. Vocal Repertoire, II

Study of the standard solo literature, including solo excerpts from larger works, i.e., cantata, oratorio, and opera; supplements the student's knowledge of the literature in his/her special field. *Prerequisite:* Junior standing in voice, or consent of instructor and concurrent registration in MUSIC 381. 1 hour.

377. Principles of Accompanying

Principles of accompanying singers and instrumentalists; practical experience in accompanying; and facility in sight reading for keyboard performers. *Prerequisite:* Advanced undergraduate or graduate standing in music or music education and consent of instructor. 4 hours or 1 unit (summer session, 2 hours or ½ unit). May be repeated to a maximum of 16 hours or 4 units.

Note: MUSIC 378 through 398 (applied music) have the following prerequisite: For students in the Bachelor of Music programs for the curricula in Vocal and Instrumental Music, junior standing in the major applied music subject as approved by the faculty of the appropriate applied music division; for students in music education, completion of the curricular requirement in the major applied music subject; and for students in other colleges of the University, completion of four semesters in the comparable applied music course at the 100-level.

378. Guitar

Instruction in guitar at the advanced undergraduate and graduate levels, predominantly classical. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

379. Harpsichord

Instruction in harpsichord at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

380. Piano

Instruction in piano at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

381. Voice

Instruction in voice at the advanced undergraduate and graduate level. 2 or 3 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

382. Organ

Instruction in organ at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

383. Violin

Instruction in violin at the advanced undergraduate and graduate level. Music majors must register concurrently in MUSIC 250. 2 or 3 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

384. Viola

Instruction in viola at the advanced undergraduate and graduate level. Music majors must register concurrently in MUSIC 250. 2 or 3 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

385. Cello

Instruction in cello at the advanced undergraduate and graduate level. Music majors must register concurrently in MUSIC 250. 2 or 3 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

386. Double Bass

Instruction in double bass at the advanced undergraduate and graduate level. Music majors must register concurrently in MUSIC 250. 2 or 3 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

387. Flute

Instruction in flute at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

388. Clarinet

Instruction in clarinet at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

389. Oboe

Instruction in oboe at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

390. Bassoon

Instruction in bassoon at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

391. Cornet and Trumpet

Instruction in cornet and trumpet at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

392. Horn

Instruction in horn at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

393. Trombone

Instruction in trombone at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

394. Euphonium

Instruction in euphonium at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

395. Tuba

Instruction in tuba at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

396. Percussion

Instruction in percussion at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

397. Harp

Instruction in harp at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

398. Saxophone

Instruction in saxophone at the advanced undergraduate and graduate level. 2 or 4 hours, or ½ or 1 unit (summer session, 1 or 2 hours, or ¼ or ½ unit).

400. Advanced Instrumentation: Chamber and Symphonic

Orchestration for chamber and symphony orchestras; works of classical, romantic, and contemporary composers. *Prerequisite:* Undergraduate instrumentation. ½ or 1 unit.

401. Advanced Instrumentation: Band

Arrangement for the concert band of works from orchestra, organ, and chamber music

repertoires by composers of the classical, romantic, and contemporary periods. *Prerequisite:* Undergraduate instrumentation. ½ or 1 unit.

402. Analysis in Relation to Performance and Interpretation

Deals with the structure of music, in which analysis is related to the performance and understandings of music from the early Renaissance through present day composition. *Prerequisite:* Graduate standing in music. ½ unit.

403. Computer-Assisted Composition

Critical evaluation of the ways in which computers have been used to write music, followed by a detailed presentation of a program for Computer-Assisted Composition. *Prerequisite:* MUSIC 303 and elementary knowledge of computer programming, or consent of instructor. 4 hours or 1 unit.

405. Individual Topics in Music Theory

Studies in specialized areas of analysis, theory systems, and aesthetics for composition-theory majors. *Prerequisite:* Graduate standing in music; consent of instructor. ½ or 1 unit. May be repeated to a maximum of 3 units.

406. Composition

Advanced study of contrapuntal forms; study of contemporary melodic and harmonic practices; and original work in advanced composition. ½ to 1½ units.

407. Readings in Music Education

Independent study of topics not treated by regularly-scheduled courses. *Prerequisite:* Graduate standing in music education. ¼ to 1 unit. May be repeated to a maximum of 2 units.

408. Psychology of Music

Study of the application of psychological principles to the teaching of and responses to music; perceptual and conceptual learning in music; uses of music in extra-musical venues, musical abilities and music preference. *Prerequisite:* Graduate standing in music education and successful completion of MUSIC 353 or the equivalent, or consent of instructor. ½ or 1 unit.

409. Principles of Curriculum in Music Education

Examination of issues related to curriculum and program development and instructional and evaluative practice as influenced by contemporary philosophical and psychological views. Consideration will be given to effect on administrative and supervisory responsibilities. *Prerequisite:* Acceptance into the MME curriculum, or consent of instructor. ½ to 1 unit.

410. History of Music Theory

The development of theoretical concepts from antiquity through the Renaissance; a study of selected theoretical treatises written before 1550. *Prerequisite:* Graduate standing in musicology or composition, or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

411. Foundations and Methods of Musicology, I

Introduction to the field for graduate students in musicology. Includes a study of bibliographic resources and techniques, online and CD ROM resources, database creation and management, basic historical method, evidence and argumentation in historical research, critical reading and logical analysis, and the nature and taxonomy of musical sources. Students begin a project on the state of research on a particular subject of their choice, which is to be completed in MUSIC 412. *Prerequisite:* Graduate standing in musicology or consent of instructor. 1 unit.

412. Foundations and Methods of Musicology, II

Introduction to the field for graduate students in musicology, continued. Semester focuses on the history of the discipline and on the theories and methods of ethnomusicology. Students conclude a project on the state of research on a particular subject of their choice, which was begun in MUSIC 411. *Prerequisite:* MUSIC 411 or consent of instructor. 1 unit.

415. Notation

History of notation from 1400 to 1600, including instrumental tablatures. *Prerequisite:* Consent of instructor. ½ unit.

417. Topics in the History of Instrumental Music

Intensive study of a period or school of instrumental composition, or of a particular genre of instrumental music. Includes wide reading in the social and intellectual climate of the period concerned; structural and stylistic analysis; work with primary sources, whenever available. *Prerequisite:* MUSIC 428 or graduate standing or consent of instructor. 1 unit. May be repeated in subsequent semesters to a maximum of 2 units.

418. Topics in Opera History

Intensive study of a period or school of opera composition or of a particular aspect of the history of opera. Wide reading in the social and intellectual climate of the period concerned; literary, dramatic, and musical analysis; and work with primary sources whenever possible. *Prerequisite:* MUSIC 428, graduate standing in musicology, or consent of instructor. 1 unit (summer session, ½ unit).

419. Orchestral Literature, I

Study of orchestral and symphonic literature from about 1700 to 1850. *Prerequisite:* Graduate standing in music and consent of instructor. ½ unit.

420. Orchestral Literature, II

Study of orchestral and symphonic literature from about 1850 to the present. *Prerequisite:* Graduate standing in music and consent of instructor. ½ unit.

421. Research in Music Education

Intensive investigation of quantitative and qualitative methodologies of music education research. Emphasizes proposing and conducting research, experimental design, historical and philosophical research techniques in music education, and data collection and analysis.

sis. *Prerequisite:* MUSIC 353 or equivalent, or consent of instructor. $\frac{1}{2}$ or 1 unit.

422. Seminar in Theory of Music

Intensive study of selected topics in the fields of music theory, history of theory, and history of musical materials. *Prerequisite:* Graduate standing in music theory, or consent of instructor. $\frac{1}{2}$ or 1 unit.

423. Seminar in Musicology

Problems in historical and systematic musicology or ethnomusicology; discussions of special problems and reports on individual research. *Prerequisite:* Graduate standing in musicology, or consent of instructor. 1 unit.

424. Seminar in the Works of a Selected Composer

Intensive historical and analytical study of the works of important composers; each semester devoted to one composer, e.g., Bach, Beethoven, Handel, Haydn, Mozart, or Wagner. *Prerequisite:* MUSIC 213 and 214; two of the following: MUSIC 310, 311, 312, 313, 314, or 315, or equivalent. 1 unit (summer session, $\frac{1}{2}$ or 1 unit). May be repeated for a maximum of 2 units.

425. Readings in Musicology and Music Theory

Individual guidance in intensive readings in the literature of musicology or music theory, selected in consultation with the instructor and in accordance with the needs and interests of the student. *Prerequisite:* Graduate standing in musicology or music theory. $\frac{1}{2}$ or 1 unit (summer session, $\frac{1}{2}$ unit).

426. Choral Literature, I

Survey of choral and vocal ensemble repertoire from the Middle Ages to 1750. *Prerequisite:* Graduate standing in music; consent of instructor. $\frac{1}{2}$ unit.

427. Choral Literature, II

Survey of choral repertoire from 1750 to the present. *Prerequisite:* Graduate standing in music; consent of instructor. $\frac{1}{2}$ unit.

428. Problems and Methods

Introduction to methods in research and stylistic criticism and to bibliographic aids, editions, and editing of music, as related to the work of the musician and composer. Reports of bibliographic problems and on individual projects are presented orally and in writing. Required of all students in the Master of Music program, except those majoring in musicology. 1 unit.

429. Historical Studies in Twentieth-Century Music

Seminar in contemporary music, with emphasis on the historical foundations of current trends in musical composition. *Prerequisite:* MUSIC 315 or 422, or equivalent. $\frac{1}{2}$ or 1 unit (summer session, $\frac{1}{2}$ unit). May be repeated to a maximum of 2 units.

430. Advanced Orchestra Conducting and Literature

Study of conducting techniques and problems related to standard orchestral literature. *Prerequisite:* MUSIC 233, or equivalent and consent of instructor. $\frac{1}{2}$ or 1 unit.

431. Advanced Band Conducting and Literature

Study of problems and techniques of band conducting; survey of literature for the concert band. *Prerequisite:* Graduate standing in music or music education. $\frac{1}{2}$ or 1 unit.

432. Advanced Choral Techniques, I

Intensive laboratory approach to the development of advanced techniques necessary for working effectively with choral ensembles. Choral majors must enroll each semester in residence. *Prerequisite:* Graduate standing in choral music, or consent of instructor. $\frac{1}{2}$ unit. May be repeated to a maximum of 2 units.

433. Advanced Choral Techniques, II

Intensive survey of choral literature with laboratory organization for reading, conducting, and interpreting choral music of all periods, styles, and voice arrangements. *Prerequisite:* Graduate standing in choral music; MUSIC 432 or equivalent, or consent of instructor. $\frac{1}{2}$ or 1 unit.

434. Piano Literature

Prerequisite: Bachelor of Music or Bachelor of Music Education, or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

435. Vocal Literature

Study of solo song in larger works and solo art song. *Prerequisite:* Bachelor of Music or Bachelor of Music Education, or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

436. Organ Literature

Intensive study of organ literature from Bach to the present; includes the music itself, recordings, and collateral readings. *Prerequisite:* Bachelor of Music or Bachelor of Music Education, or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

437. String Instrument Literature

Prerequisite: Bachelor of Music or Bachelor of Music Education, or consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

438. Wind Instrument Literature

Survey of solo and ensemble wind literature; includes analysis and performance (when possible) of the music itself, recordings, and collateral readings. 1 unit. May be repeated to a maximum of 2 units.

439. Percussion Instruments Literature

Survey and analysis of the field of solo and ensemble percussion literature; includes analysis and performance (when possible) of the music itself, recordings, and collateral readings. *Prerequisite:* Graduate standing in music; consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

440. Foundations and Principles of Music Education, I

Consideration of the historical and philosophical foundations of music education and their implications for developing curricular and instructional approaches to the field of music education. *Prerequisite:* Graduate stand-

ing in music or music education, or consent of instructor. $\frac{1}{2}$ or 1 unit.

441. Foundations and Principles of Music Education, II

Consideration of the psychological foundations of music education and implications of contemporary theory for the development of processes of instruction, administration, supervision, and evaluation of music education programs. *Prerequisite:* Graduate standing in music or music education, or consent of instructor. $\frac{1}{2}$ or 1 unit.

443. Administration and Supervision of Music Education

Studies the functions of supervisors and directors of music education in administering music programs in elementary and secondary schools. $\frac{1}{2}$ or 1 unit.

444. The General Music Program in Elementary Schools

Concentration on contemporary practices in elementary general music education as influenced by current learning theory and educational principles. Includes consideration of methodology, materials, curricular aims, and evaluation. *Prerequisite:* Graduate standing in music education, or consent of instructor. $\frac{1}{2}$ or 1 unit.

445. Music in Higher Education

Orientation to the organization, teaching, and administration of music in the college and university. *Prerequisite:* Graduate standing in music or music education. $\frac{1}{2}$ or 1 unit. Offered in summer session only.

448. Computer Music

Representation of sound signals in a digital computer; methods for input and output of sounds to and from a computer; sound synthesis programs; synthesis of simple musical structures; use of graphics; processing of live sounds by computer; editing and retrieval; fidelity of computer-produced sounds; and hybrid analog/digital computers. *Prerequisite:* Graduate standing in composition-theory, or consent of instructor. 1 unit.

449. Problems in Band Conducting

Examination of techniques of rehearsal, conducting, and preparation of band organizations for concert performance; emphasizes discussion, analysis, and preparation of selected scores and the problems they present. *Prerequisite:* Graduate standing, or experience as a band conductor. $\frac{1}{2}$ or 1 unit.

450. History of Vocal Ensemble and Choral Music

Critical and analytical study of vocal ensemble and choral music from the Middle Ages to the present. *Prerequisite:* MUSIC 426 and 427, or equivalent, or consent of instructor. $\frac{1}{2}$ unit. May be repeated to a maximum of 2 units.

452. Choral Conducting Project

Participation in a graduate choral conducting laboratory and preparation of a choral ensemble for public performance. Required during the final semester in residence for candidates in the Master of Music in choral music curriculum. *Prerequisite:* MUSIC 432 and consent of instructor. $\frac{1}{2}$ unit.

454. Advanced Choral Performance Techniques

Study of performance problems and musical analysis of choral music with techniques of preparation and rehearsal from the various style periods: renaissance, baroque, classic-romantic, and contemporary. *Prerequisite:* Admission into the Doctor of Musical Arts choral music program, or the equivalent background in other doctoral degree programs. $\frac{1}{2}$ unit. May be repeated to a maximum of 2 units.

455. The Choral Program in Secondary Schools

In-depth study of the methods and materials appropriate for teaching choral music in the secondary schools. *Prerequisite:* Graduate standing in music or music education. $\frac{1}{2}$ or 1 unit.

460. Practicum in Piano Teaching: Children and Teenagers

Student teaching of group piano and musicianship classes for elementary, middle, and high school students; weekly seminar devoted to evaluation and improvement of teaching techniques. *Prerequisite:* Graduate standing in music; MUSIC 331, or equivalent. 1 unit.

461. Practicum in Piano Teaching: Adults

Student teaching of group piano for adults in the private studio, community college, and university; weekly seminar devoted to evaluation and improvement of teaching techniques. *Prerequisite:* Graduate standing in music; MUSIC 332, or equivalent. 1 unit.

464. Advanced Technology-Based Music Instruction

Continuation of topics introduced in MUSIC 358 in greater depth. Special attention to the application of multimedia and MIDI technologies in the development of advanced class projects. Creation of HTML (HyperText Markup Language) resources with music education applications on the Internet. *Prerequisite:* MUSIC 358; graduate standing or consent of instructor. $\frac{1}{2}$ or 1 unit. Higher credit will require a major project and paper using multimedia technology and/or Internet resources.

477. Advanced Accompanying

Principles of accompanying singers and instrumentalists, practical experience in accompanying, and facility in sight reading for keyboard performers. *Prerequisite:* Graduate standing in music or music education, or consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

480. Piano

Prerequisite: Bachelor of Music degree; successful completion of a qualifying audition for the piano faculty. $\frac{1}{2}$ or 1 unit.

481. Voice

Prerequisite: Bachelor of Music degree; successful completion of a qualifying audition for the voice faculty. $\frac{1}{2}$ or 1 unit.

482. Organ

Selected studies from the masterworks of organ literature. *Prerequisite:* Bachelor of Music degree; successful completion of a qualifying audition for the organ faculty. $\frac{1}{2}$ or 1 unit.

483. String Instruments

Prerequisite: Bachelor of Music degree; successful completion of a qualifying audition for the appropriate applied music faculty; concurrent registration in MUSIC 250 or 350, section K, for students in the Master of Music curriculum in strings. $\frac{1}{2}$ or 1 unit.

484. Wind Instruments

Prerequisite: Bachelor of Music degree; successful completion of a qualifying audition for the appropriate applied music faculty. $\frac{1}{2}$ or 1 unit.

485. Percussion Instruments

Prerequisite: Bachelor of Music degree; successful completion of a qualifying audition for the percussion faculty. $\frac{1}{2}$ or 1 unit.

489. Doctoral Projects

Special projects for candidates for the Doctor of Musical Arts degree. Open only to students in the Doctor of Musical Arts program. *Prerequisite:* Consent of instructor. 0 to 4 units (summer session, 0 to 2 units).

490. Seminar in Music Teacher Education

Intended for prospective university teachers of undergraduate music education majors; covers educational philosophy, curriculum design, methods of teaching and evaluation, and student teaching and observational experiences as they relate to undergraduate music teacher preparation. *Prerequisite:* Graduate standing in music education; at least three years of public school music teaching experience is highly recommended. $\frac{1}{2}$ or 1 unit.

499. Thesis Research

Research in special projects. *Prerequisite:* Consent of instructor. 0 to 4 units.



NATURAL RESOURCES AND ENVIRONMENTAL SCIENCES

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Natural Resources and Environmental Sciences (NRES)

100. Earth Care

Introductory systems approach examining the relationship among humans, natural systems, and the resource base. Course addresses the extent of human impact on natural systems and the ability of natural systems to recover. Environmental issues are critically examined from the individual's perspective. Course provides a framework for understanding natural ecosystems and their relationship to human intervention. 3 hours.

101. Introductory Soils

The nature and properties of soil including origin, formation, and biological, chemical, and physical aspects. *Prerequisite:* CHEM 100 or equivalent. 4 hours.

102. Introduction to Forestry

The forest as a renewable natural resource; the aims and scope of forestry; economic and social importance of forests to the nation; the principal forest regions and species; forests for timber supply, for water conservation, for recreation, and for wildlife; the principles of forest management and protection; and the development of public and private forestry in the United States. 3 hours.

103. Introduction to Horticulture

Basic principles of plant growth and development as they apply to the production, marketing, and utilization of fruits, vegetables, and ornamental plants. 3 hours.

104. Introduction to Environmental Science

Introductory course intended primarily for Natural Resources and Environmental Sciences' majors emphasizing ecological concepts, including energy, biogeochemical cycles, classification of ecoregions, species interactions, climate and weather, and atmospheric chemistry will be presented in the context of establishing the ecological basis of contemporary environmental issues, such as loss of biological diversity, global climate, ozone depletion, and natural resource management. 4 hours. Students may not receive credit for both NRES 104 and either EEE 105 or CPSC 236.

105. Home Vegetable Gardening

Principles and practices of producing vegetables in the home garden by traditional and organic methods; lecture and laboratory. 3 hours. Credit is not given to horticulture majors. All other students may not receive credit for both NRES 105 and 264.

106. Floriculture for the Home

Fundamentals of home gardening and the effective use of ornamentals as a part of the home environment; subjects include the selection, culture, and use of garden annuals, biennials, perennials, bulbs, and house plants; garden tools and equipment; soil preparation; plant propagation; principles of design and planting methods; garden maintenance; use of fertilizers; pest control; training and pruning; lawn care; hybridizing; growing structures; and care of cut flowers. Not open to students in the ornamental horticulture curriculum. 3 hours.

107. Introduction to Floral Design

Introduces the art of arranging flowers, foliage, and accessories according to the principles of design. Lecture and lab; fee required. 2 hours. Credit not given for students in ornamental horticulture.

108. Forests and Their Environment

Field course to examine the environment of upland and bottomland forest ecosystems, including basic forest biology, resource measurements, wildlife habitats, nutrient cycling, water quality, and management strategies.

Impacts of air pollution on forests. Students will be active participants in learning about a forest environment through field experience with weekly trips to Allerton. *Prerequisite:* Freshman standing only, nonmajors. 1 hour.

109. The State of the Planet: A Realistic Assessment of Global Environmental Issues

Discussion course that focuses on analyzing opposing points of view on contemporary environmental issues. Students will engage in roll-playing activities, debates, and other participatory activities to explore the ecological and social dimensions of the issues. 3 hours.

120. Introduction to Applied Entomology
Same as CPSC and ENTOM 120. See CPSC 120.

130. Medical Crops and Herbology

Same as CPSC 130. The use of cultivated and wild plants in medicines and health products according to Eastern and Western medical traditions. Consideration of herbal medicine use from ancient times to the present, important medicinal chemicals produced by plants, and the evaluation of plant chemical products as potential human medicines. 3 hours.

140. Ecology of Agricultural and Forest Systems

Same as CPSC 140. Introduction to principles of ecology especially those concerning populations, communities and ecosystems. Case studies emphasize importance of principles in agriculture, forestry, and energy use. *Prerequisite:* An introductory course in general biology, and completion of campus Composition I general education requirement. 3 hours. Students may not receive credit for both this course and EEE 105.

183. Introduction to Fibers and Textiles

Same as ACE 183. Introductory study of textile fibers, yarns, fabrications, finishes, and regulatory legislation that is designed to improve consumer competence in selection, use, and care of textile products. *Prerequisite:* CHEM 100. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

200. Professional Internship

Supervised off-campus learning experience of at least 300 hours in a natural resource and environmental sciences related enterprise. *Prerequisite:* Junior standing; good academic standing; major in forestry, horticulture, natural resource and environmental sciences or related agricultural major; completion of a 200- or 300-level course appropriate to the internship activities; and consent of instructor. 1 to 4 hours. May be repeated to a maximum of 4 hours.

204. Survey of Environmental Literature
Reading and discussion of selected environmental-theme major writings from various periods including Malthus, Marsh, Emerson, Leopold, Carson, Gore, and Steingraber with particular emphasis on the environmental issues of the time and the literary treatment of the issues as they relate to the human dimen-

sions of environmental issues, including the resolution of the issues. 3 hours.

205. Exploring the Dynamics of Forest Ecosystems

Examines various processes affecting the establishment, growth, and development of trees, stands, and forests. Computer models will be used to analyze the individual and cumulative effects of environmental factors. 3 hours. Credit is not given for Forestry majors.

209. Issues Facing Professionals in Agriculture

Develops students' understanding of environmental, ethical and societal issues facing professionals in agriculture. Approaches to communicating with society about these issues will be explored through seminars, discussions, debates, student presentations, and writing assignments. *Prerequisite:* Completion of campus Composition I general education requirement. 3 hours.

210. Economics of the Environment

Same as ACE, ENVST, ECON, and U P 210. See ACE 210.

211. Forest Ecology (Summer Field Studies)

Introduction to forest ecology and the application of ecological principles in silviculture and management practices. *Prerequisite:* Competence in the courses prescribed in the first two years of the forestry curriculum. 2 hours.

212. Wildland Recreation (Summer Field Studies)

Field study of wildland recreational resources and facilities, user characteristics and preferences, and management techniques within the multiple-use concept. *Prerequisite:* Competence in the courses prescribed in the first two years of the forestry curriculum. 1 hour.

213. Silviculture

The art and science of controlling forest establishment, composition, and growth to best fulfill the objectives of the owner. *Prerequisite:* NRES 211 and 226. 3 hours. Required field trip.

215. Introduction to Forest Resource Management (Summer Field Studies)

Field introduction to forest resource management, including wildlife management, watershed management, and forest protection. *Prerequisite:* Competence in the courses prescribed in the first two years of the forestry curriculum. 2 hours.

219. Ecological Foundations for Ecosystem Management

Study of the structure and functioning of ecosystems and how ecosystems can be managed in a more sustainable manner. Examples of ecosystems which will be discussed include: forests, agricultural systems, freshwater environments, and wetlands. *Prerequisite:* A course in biology or consent of instructor. 3 hours.

220. Plant and Animal Genetics

Same as CPSC and ANSCI 220. See CPSC 220.

221. Forest Measurements (Summer Field Studies)

Introduction to forest measurements, including individual tree and stand measurements, inventory methods, and determination of the growth of trees and stands; topics in surveying and aerial photogrammetry. *Prerequisite:* Competence in the courses prescribed in the first two years of the forestry curriculum. 2 hours.

222. Contemporary Issues in Natural Resources and Environmental Sciences

Forum for lectures/discussions in current topics related to natural resources and environmental science. Each semester five topics are selected for detailed study, including the scientific basis behind the issue and the social, economic, and policy implications with discussions led by several faculty. Possible topics include tropical forests, global warming, biodiversity, air pollution effects on natural ecosystems, ecosystem restoration, impacts of land use on forest ecosystems, wetlands, and other current areas. *Prerequisite:* NRES 102, CPSC 236, or GEOG 214, or consent of instructor. 3 hours.

223. Introductory Ecology for Educators

Same as ENVST 283. Intended primarily for education students. Basic ecological concepts and how they may be incorporated into the classroom; includes ecosystem structure and function, communities and population, energy flow and nutrient cycling, and integrating ecology/environmental education into the classroom. 3 hours. Field trip required.

225. Forest Land Policy and Administration

Examines forest land policies and their administration emphasizing the relations among resources, politics, and people; current major problems in forest land policy administration and progress toward their solution. *Prerequisite:* ECON 101 or consent of instructor. 3 hours.

226. Dendrology

Taxonomy, geographical distribution, economic importance, and elementary silvics of the important forest trees in the United States and Canada. *Prerequisite:* PLBIO 100. 4 hours.

227. Introduction to Weed Science

Same as CPSC 226. See CPSC 226.

230. Urban Forestry

Management of wooded areas in urban and community settings, including how trees improve the urban environment and how they react to urban stresses. Students learn how to conduct urban tree inventories, write municipal tree ordinances, and to place monetary values on individual privately owned and civically controlled trees. Includes field trips and laboratory. *Prerequisite:* NRES 226 or 254, or equivalent. 3 hours.

231. Wood Utilization (Summer Field Studies)

Field and classroom exercises in logging and milling, conversion of raw wood to useful products, visits to plants, and industrial aspects of wood use. *Prerequisite:* Competence in the courses prescribed in the first two years of the forestry curriculum. 1 hour.

232. Anatomy and Wood Utilization

Principles and methods of harvesting trees; conversion processes of lumber and wood-based materials; recycling wood for energy; structure of wood and its relationship to the properties and uses of wood. *Prerequisite:* NRES 231 or consent of instructor. 3 hours.

234. Wood Composites

Theory of adhesion; wood bonding; the effects of physical properties and processing parameters on the performance of wood composites. 3 hours.

236. Physical Properties of Wood and Wood-Base Materials

Physical properties of wood materials, emphasizing the influence of anatomy, density, and moisture content on the dimensional stability of wood materials; wood-liquid relations; thermal, electrical, and acoustical properties of wood. The theory and practice of wood seasoning are also studied. *Prerequisite:* CHEM 101 and PHYCS 101 or 140, or consent of instructor. 3 hours.

240. Plant Propagation

Examines theory and methods employed in propagation of plants, emphasizing anatomical, physiological, and ecological principles involved in sexual propagation (seeds) and asexual propagation (division, cuttings, budding, grafting, tissue culture, etc.). *Prerequisite:* PLBIO 100 or consent of instructor. 3 hours.

241. Greenhouse Management and Production

Survey of topics relating to commercial greenhouse operations, management, and production. Examines design, location, and glazing of greenhouse structures; greenhouse operations such as heating, cooling, environmental control, and irrigation systems; production factors including light, temperature, root media, fertilization, watering, and integrated pest management; and management concepts such as industry trends and cost analysis. Production of fall flowering potted crops and greenhouse vegetables will be emphasized. *Prerequisite:* NRES 101 and 103, or consent of instructor. 4 hours. A field trip is required.

242. Nature and American Culture

Same as HIST and LEIST 242, and L A 216. See LEIST 242.

243. Bedding Plant Production, Use, and Identification

Examines the commercial production, use, and identification of herbaceous, frost-tender ornamental plants, largely flowering annuals, grown for outdoor bedding purposes. Includes field trip. *Prerequisite:* PLBIO 100. 3 hours.

244. Herbaceous Perennials: Identification and Use

Identification of herbaceous perennials; cultural requirements and uses in the landscape; discussion of perennial border design for continuous flowering. *Prerequisite:* PLBIO 100. 3 hours.

245. Indoor Plant Culture, Use, and Identification

Culture, use, and identification of indoor plants in relation to their application in interior situations; discusses the influence of water, fertilizer, soil type, light (natural and artificial), relative humidity, storage, and shipping. Students design and maintain an interior plant area; lecture and lab. *Prerequisite:* PLBIO 100 or consent of instructor. 3 hours. A field trip is required.

246. Floral Design, I

Applies principles of design to the composition and decorative use of flowers, foliage, and accessories. Registration open to students in Ornamental Horticulture, Horticulture, Agricultural Education, and Restaurant Management or with consent of instructor. 3 hours.

247. Flower Shop Management and Floral Design, II

Introduces flower shop management: includes the location, establishment, and financing of a new or existing shop and basic skills in management, pricing, buying, delivery, and display. Covers advanced floral design skills. *Prerequisite:* NRES 246. 3 hours.

252. Turfgrass Management

Examines the principles and practical knowledge necessary for the establishment and maintenance of high-quality turfgrass stands for use as home lawns, golf courses, athletic fields, parks, and other commercial uses; presents an integrated approach to management that considers conservation of resources and environmental impacts in relationship to turfgrass quality. *Prerequisite:* PLBIO 100. 3 hours.

253. Identification and Use of Woody Ornamental Plants, I

Systematic approach to the identification, ornamental characters, culture, propagation, production, and use of woody ornamental deciduous trees and shrubs; special emphasis on the cultivated varieties. *Prerequisite:* PLBIO 100 or consent of instructor. 3 hours.

254. Identification and Use of Woody Ornamental Plants, II

Systematic approach to the identification, ornamental characters, culture, propagation, production and use of woody ornamental conifers, broadleaf evergreens, vines, ground covers, and woody ornamental deciduous trees and shrubs; special emphasis on the cultivated varieties. *Prerequisite:* PLBIO 100 and NRES 253, or consent of instructor. 3 hours.

255. Home Grounds Planning and Design

Practice of developing home grounds emphasizing planting design; analysis of and practical solutions for typical site problems; and evaluating garden structures as elements in home grounds planning and design. *Prerequisite:* NRES 254; limited to horticulture majors, students in the ornamental horticulture curriculum, or students in the agriculture occupations for secondary teachers curriculum. 4 hours.

256. Home Grounds Development and Construction

Continuation of NRES 255, with emphasis on development of home grounds and construction methods and techniques. *Prerequisite:* NRES 255; limited to horticulture majors, students in the ornamental horticulture curriculum, or students in the agriculture occupations for secondary teachers curriculum. 3 hours.

257. Landscape Contracting

Interpretation of the landscape architect's plans and specifications; estimating quantities of materials; and computing costs and procedures for bidding and executing landscape construction. *Prerequisite:* NRES 256. 3 hours. Registration limited to horticulture majors, students in the ornamental horticulture curriculum, or students in the agriculture occupations for secondary teachers curriculum only.

258. Arboriculture

Evaluates criteria for ornamental woody plant selection, cultivation, valuation, and maintenance; links the technical skills and practices for commercial arborists to an understanding of woody plant physiology and anatomy; emphasizes marketing and promotion of horticultural expertise. 3 hours. Offered in alternate years.

259. Landscape Plants Production

Emphasizes woody ornamental plant production, nursery operation, and nursery business management techniques; compares both traditional and computer-aided management tools; examines industry scope and diversity through nursery visits, presentations by nursery operators, and student-directed interviews/presentations throughout the state. Field trip required; see *Timetable* for approximate cost. 3 hours. Offered in alternate years.

261. Small Fruit and Viticulture Science

Technological application of biological principles to the culture of strawberry, grape, blueberry, raspberry, blackberry, currant, gooseberry, and miscellaneous small fruits. *Prerequisite:* NRES 103 or PLBIO 100. 3 hours.

262. Tree Fruit Science

Examines biological principles, cultural methods and practices involved in the growth and production of the apple, pear, peach, cherry, plum, apricot, almond, and miscellaneous citrus and nut crops. *Prerequisite:* NRES 103 or PLBIO 100. 3 hours. Offered in alternate years.

264. Commercial Vegetable Production

Commercial vegetable production with emphasis on cultural considerations and harvest and handling of selected vegetable crops; integrates principles of plant growth into vegetable production schemes; covers vegetable classification, growing practices, and handling in the context of current commercial production systems. *Prerequisite:* NRES 101 and 103. 3 hours. Students may not receive credit for both NRES 264 and 105.

266. Environmental Botany

Same as PLBIO 266. See PLBIO 266.

273. Presenting Environmental Information

Same as AGCOM and ENVST 273. See AGCOM 273.

275. Environmental Communications

Same as AGCOM, and ENVST 273. See AGCOM 275.

276. Soil Evaluation

Eight week lab and field based course involving description, interpretation, and classification of soil profiles. Overnight field trip; students pay costs that reflect actual expenses. *Prerequisite:* NRES 101 or consent of instructor. 1 hour. May be repeated to a maximum of 3 hours. May not be taken concurrently with NRES 376.

277. Interpretation of Aerial Photographs

Same as GEOG 277. See GEOG 277.

279. Soil Ecology

Same as CPSC 279. Evaluates soil ecology as the basis for ecological stability in natural and managed ecosystems. Course examines how interrelationships among soil's physical, chemical, and biological properties define its functional capacities. Lecture and discussion will emphasize plant-soil relations and will emphasize fundamental concepts in applied ecology drawing examples from natural, agricultural, and urban/industrial settings. *Prerequisite:* NRES 101 or consent of instructor. 3 hours.

280. Environmental Textiles

Study of textile systems that offer protection from chemical, biological, thermal, and mechanical hazards; geotextiles that prevent soil erosion, reinforce dikes and highways, and control seepage of polluted water; and interior textiles such as carpeting, upholstery, and window and wall treatments that enhance the aesthetic and functional aspects of interior environments. *Prerequisite:* CHEM 100. 3 hours.

281. Soils and Society

Nature of soils and their uses by humankind and the influences of soils on plant and animal ecology. 2 hours. Does not fulfill requirements for advanced soil courses. Not for science majors.

287. Nature, Society, and Democracy

Same as POL S 287. Course will develop critical and analytic thinking about socially induced environmental destruction and possible alternatives that could lead contemporary society into an ecological society. *Prerequisite:* A 100- or 200-level social science course or consent of instructor. 3 hours.

290. The Insects of Forest and Landscape Trees, Shrubs, and Flowers

Same as ENTOM 280. Basic ecology and life histories of insects and mites of trees, shrubs, and flowers will be presented in lectures, accompanied by slide and video presentations, a multimedia computer program, and specimen examinations in the laboratory sessions. Cultural, biological, and chemical control strategies will be presented. *Prerequisite:* ENTOM 120 or consent of instructor. 3 hours. Local campus field collecting trips will be taken.

300. Special Problems

Supervised research on individual problems in any phase of Natural Resources and Environmental Sciences. *Prerequisite:* Not open to students on probation; written consent of instructor and authorized departmental approval required prior to advanced enrollment and registration. The honors section is open to James Scholars and other students having a minimum GPA of 3.0 and may be taken in conjunction with other courses in the department subject to approval of the instructor. 1 to 5 hours, or 1/2 to 2 units.

301. Watershed Hydrology

Course will examine theories, measurement techniques, statistical analyses of hydrologic data and simulation modeling of hydrologic events. Topics include watershed delineation, estimation of runoff and evapotranspiration, and interaction between ground-water and surface water. Case studies that quantify water movement in specific watersheds will be used to integrate course topics. *Prerequisite:* One college-level course in each of the following: Calculus, CHEM, ECON, PHYCS, STAT. 3 hours or 3/4 unit.

305. Plants and Global Change

Same as CPSC and PLBIO 305. See CPSC 305.

308. Plant Tissue Culture

Same as CPSC 308. Survey, description, and applications of cell and tissue culture in vitro strategies for plant research and production. Topics include the culture environment, media composition, tissue manipulation, organogenesis, embryogenesis, somatic hybridization, bioreactors, and use of these techniques for plant propagation and physiological and biochemical research. Independent research project will be conducted by each student during the course of the semester in addition to lecture-discussion and lab sessions. *Prerequisite:* CHEM 231, PLBIO 100 or consent of instructor. 4 hours or 1 unit.

310. Natural Resources Economics

Same as ACE 310 and ENVST 317. See ACE 310.

311. Forest Resource Economics

Applies principles of economics to the establishment, development, and use of forest and related natural resources; major concepts studied include production economics, capital budgeting, forest taxation, financial maturity, and supply, demand, and valuation of major forest products. *Prerequisite:* ECON 101 and NRES 321; or consent of instructor. 4 hours or 1 unit.

315. Forest Soils

Advanced study of the chemical, physical, and biological properties of forest soils; includes the relationship of forest soils to site productivity, forest fertilization, intensive forest management, and environmental problems. *Prerequisite:* NRES 101. 3 hours or 3/4 unit.

316. Advanced Forest Ecology

Relationship between environmental factors and the structure and function of forests, including carbon, water, and nutrient cycles. Integrates a basic understanding of forest ecology into forest resource management. Two

Saturday field trips required. *Prerequisite:* NRES 211 or consent of instructor. 3 hours or 3/4 unit.

318. Tropical Forest Ecosystems

Examines the interactions between climate and soils and the structural and functional characteristics of natural and managed tropical forests, and the relation of tropical forests to global issues such as greenhouse effect and biodiversity. *Prerequisite:* NRES 316 or 319, or PLBIO 381 or equivalent. 3 hours or 3/4 unit.

319. Environment and Plant Ecosystems

Relationships among environmental factors and plant processes and functions; impact of human activities on the environment and the structure and function of plant ecosystems. Examples will be drawn from a variety of managed and unmanaged plant ecosystems. *Prerequisite:* One course in biology, CHEM 102 or NRES 101 or equivalent, or consent of instructor. 3 hours or 3/4 unit.

320. Restoration Ecology

Historical development of ecological restoration, its philosophical foundation, multidisciplinary borrowings from the natural, applied, and social sciences, and varied practical applications, with an emphasis on the application of ecological principles. Case studies, field trips, and laboratory activities on restoration planning. *Prerequisite:* Introductory plant biology or ecology course. 4 hours or 1 unit.

321. Natural Resources Biometrics

Examines statistical methods and modeling techniques used in the management of forest and natural resources; includes applied regression analysis, sampling techniques and conceptual modeling. *Prerequisite:* MATH 120 and NRES 221; and STAT 100 or ACE 261, or equivalent. 3 hours or 3/4 unit.

322. Fish and Wildlife Ecology

Same as EEE 342. Application of ecological principles and modeling to management of fish and wildlife populations; significance of abiotic and biotic factors, including life-history parameters in population growth and management; and techniques and procedures for the development of management strategies for animal populations, emphasizing vertebrates. *Prerequisite:* BIOL 122 or equivalent. A course in statistics is highly recommended. 5 hours or 1 unit.

323. Principles of Plant Breeding

Same as CPSC 323. See CPSC 323.

325. Forest Resource Management

Integration and synthesis of forestry concepts and quantitative decision-making techniques applied to managing forests to meet the objectives of both public and private forest land owners. *Prerequisite:* NRES 311 or consent of instructor. 4 hours or 1 unit.

326. Tree Physiology

Study of tree functions as they relate to tree structure, environment, and cultural practices; emphasizes photosynthesis, carbohydrate metabolism, nitrogen metabolism, water relations, and symbiotic associations of trees.

Prerequisite: PLBIO 100 and CHEM 102 or 103. 3 hours or ¾ unit.

327. Ecological Modeling for Natural Resource Analysis

Mathematical and computational methods to develop and analyze dynamic ecological system models. Students will develop and analyze their own ecological model as a final comprehensive project. Course is designed to enhance analysis skills. *Prerequisite:* MATH 120 or 134, a course in basic or general ecology, and senior standing. 4 hours or 1 unit.

330. Aquatic Ecosystem Conservation

Application of the principles of aquatic ecology to a broad range of issues. The role of physics, chemistry, and biology in natural resource management will be examined. *Prerequisite:* CHEM 101, PHYS 140, MATH 120, and EEE 212, NRES 219, or the equivalent of NRES 219, or consent of instructor. 3 hours or ¾ unit.

332. Mechanical Properties of Wood and Wood-Base Materials

Static mechanics, strength properties, and structural designs of wood, plywood, particle-board, and hardboard, emphasizing the standard methods of testing wood and fibrous material, wood beam and column designing, and other factors concerning the strength of wood materials, particularly the derivation of allowable stresses. *Prerequisite:* PHYS 101. 3 hours or ¾ unit.

333. Plant Physiology Laboratory

Same as CPSC and PLBIO 333. See PLBIO 333.

336. Perennial Grass Ecosystems

Same as CPSC 336. Different levels of ecological organization in perennial grass ecosystems. Provides advanced study for students in turfgrass and forage management. Cultural programs are derived from an understanding of interrelationships between different components of the ecosystem, including human and animals. Field trips; see *Timetable* for approximate cost. *Prerequisite:* NRES 252 or CPSC 322. 4 hours or 1 unit. Term paper required.

340. Applied Statistical Methods

Same as AG E, ANSCI, CPSC, and FSHN 340. See CPSC 340.

341. Floricultural Crops Production

Examines in detail the commercial production cycles of major and minor floricultural crops grown as potted flowering plants and cut flowers, and bedding plant production systems. Cultural practices are derived from an understanding of the interrelationships between environmental conditions, species requirements, production systems, and floricultural physiology. *Prerequisite:* NRES 240 and 241, or consent of instructor. 4 hours or 1 unit. A field trip is required.

342. Plant Nutrition

Studies the mechanisms of and factors affecting the absorption, transport, distribution, and functions of the essential elements required by higher plants. Lectures and discussions. *Prerequisite:* NRES 101; PLBIO 234 or 330. 4 hours or 1 unit. Offered in alternate years.

343. Floricultural Physiology

Studies the physiology and metabolism of floricultural crops during their development from seeds through flowering. Lectures and discussion. *Prerequisite:* NRES 101, PLBIO 100, or consent of instructor. 4 hours or 1 unit.

344. Social Impact Assessment

Same as ENVST, L A, LEIST, R SOC, and U P 344. See LEIST 344.

345. Statistical Methods

Same as AG E and ANSCI 345. See ANSCI 345.

346. Ecological Numeracy: Planning Analysis of Environmental Issues

Same as GEOG, and U P 346. See U P 346.

347. Horticultural Plant Breeding

Methodology, objectives, and constraints of breeding for improved cultivars of flowers, woody ornamentals, turfgrasses, fruits, and vegetables. Emphasis on breeding objectives and methods unique to horticultural commodities such as color, appearance, flavor and shelf-life, nutritional value, and other characteristics that determine product quality. *Prerequisite:* NRES 220. 3 hours or ¾ unit. Offered in alternate years.

348. Rural Real Estate Appraisal

Same as ACE 348. See ACE 348.

349. Science, Technology, and Environmental Policy

Same as SOC 349. Course explores the environmental policy process; highlighting the scientific, technological and institutional factors that influence the formulation, application, evaluation, and changes of environmental policy. Course introduces a set of key environmental and sociological problems for class analysis and explores possible outcomes based on the defensible arguments of social and natural scientists. *Prerequisite:* NRES 216 or consent of instructor. 4 hours or 1 unit.

351. Environmental Organic Chemistry

Same as ENVST 351. Transport and transformations of organic compounds in the environment, with emphasis on the mechanisms, kinetics, and products of reactions that occur under environmental conditions typical of the atmosphere, surface and subsurface waters, and solid phases of the earth. Topics include hydrolysis, redox reactions, disinfection, and photochemistry. *Prerequisite:* CHEM 231 or 236, or consent of instructor. 3 hours or ¾ unit.

354. Geographical Information Systems for Natural Resource Management

Hands-on approach to the study of the concepts of geographical information systems and remote sensing for natural resource management. Personal computers and a user-friendly GIS software will be used to demonstrate the utility of these techniques for data acquisition, image processing, and map modeling. Exercises will include problems relevant to the management of natural resources such as land cover mapping, monitoring, suitability and productivity assessment, landscape pattern analysis, land use change analysis, spatial modeling, and decision making. *Prerequisite:* NRES 316 or 319, or consent of instructor. 3 hours or ¾ unit.

355. Advanced Geographic Information Systems for Natural Resource Planning

Examines the application of Geographic Information Systems (GIS) to natural resource planning and decision making. Course integrates principles of decision making in various contexts: public and private; single objective and multiple criteria; and under various forms of management constraints. Management alternatives are then incorporated into a GIS system for further review and analysis. Course will combine GIS software with computer-based optimization or quantitative decision making models. *Prerequisite:* NRES 354 or equivalent, or consent of instructor. 2 hours or ½ unit.

358. Communication in Environmental Social Movements

Same as ENVST and SOC 345, and AGCOM 348. See AGCOM 348.

364. International Food Crops

Survey of the botany, physiology, breeding, production practices, and pest management of the major international food crops. Tropical and subtropical crops are emphasized and aspects of agriculture in developing countries are discussed. *Prerequisite:* CPSC 121, NRES 103, or PLBIO 100. 3 hours or ¾ unit. Offered in alternate years.

365. Growth and Development of Horticultural Crops

Factors affecting growth, development, and quality of horticultural crops, such as photoperiodism, growth regulators, carbon dioxide levels, etc. Lecture and discussion. *Prerequisite:* One year of general chemistry and one semester of general or plant physiology, or consent of instructor. 4 hours or 1 unit. Offered in alternate years.

367. Postharvest Physiology of Horticultural Crops

Physiology, biochemistry, and anatomy of fruits and vegetables during development, maturation, and ripening in situ and in storage. *Prerequisite:* PLBIO 100 and CHEM 102 or 103, or equivalent. 4 hours or 1 unit. Offered in alternate years.

368. Soil Fertility and Fertilizers

Factors affecting the supply of available major, secondary, and minor elements in soils and their influence on crop production; evaluating fertilizer and lime needs; and fertilizer manufacture, sources, and application methods. *Prerequisite:* NRES 101. 3 hours or ¾ unit.

369. Spatial Ecosystem Modeling

Same as BIOL 369 and GEOG 369. See GEOG 369.

370. Environmental Psychology

Same as PSYCH 372. Survey of theory and research in environmental psychology; topics include environmental perception and cognition, environmental stress, environmental quality assessment, ecological psychology, and historical and theoretical perspectives on the interaction between people and their environments. *Prerequisite:* PSYCH 100, 103, or 105, or consent of instructor. 3 hours, or ¾ or 1 unit.

371. Pedology

Introduction to soil genesis, classification, and morphology. Includes the factors of soil formation; properties and methods used in distinguishing soils, organization of natural soil knowledge; interpretation of soil profiles and soil stratigraphy, causes of soil variability and impact upon soil management, land-use decisions, and the environment. *Prerequisite:* NRES 101 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

372. Soil Testing Practicum

Chemical procedures useful in assessing soil/plant relationships for field crops; involves lectures on agronomic principles, fieldwork on sampling, and laboratory time to perform soil tests, interpret the analytical results, and formulate a nutrient management program. Field trip; see *Timetable* for approximate cost. *Prerequisite:* NRES 101. 2 or 3 hours, or $\frac{1}{2}$ or $\frac{3}{4}$ unit. Additional laboratory work and consent of instructor required for 3 hours or $\frac{3}{4}$ unit credit.

374. Soil Conservation and Management

Application of principles of soil conservation and management to the solution of land-use problems; influence of soil characteristics on erosion control, cropping intensity, water management, and land-use planning. Field trip; see *Timetable* for approximate cost. *Prerequisite:* NRES 101. 3 hours or $\frac{3}{4}$ unit.

375. Soil Microbiology

Metabolic processes leading to chemical transformations in soil and water environments; implications for soil fertility and environmental pollution. *Prerequisite:* CHEM 102. 3 hours or $\frac{3}{4}$ unit.

376. Field Pedology

Laboratory-and field-based course emphasizing the fundamentals of understanding, describing, identifying, mapping, interpreting, and classifying soils and soil-landscapes; emphasizes impact of soil variability on use and management of soils. Trips to map and classify soils locally and regionally; students pay travel costs which reflect actual field expenses. *Prerequisite:* Credit or concurrent registration in NRES 371. 2 hours or $\frac{1}{2}$ unit.

377. Introduction to Remote Sensing

Same as GEOG 377. See GEOG 377.

378. Statistical Ecology

Same as EEE 373. See EEE 373.

379. Advanced Soil Ecology

Same as CPSC 379. Evaluates current issues and methods in soil ecology research. Course uses discussion, scientific literature and direct experimentation to explore relationships among the physical, chemical, and biological properties of soils and their impacts on soil function. Discussions will address the relationship between soil properties and the resistance, resilience, and sustainability of natural and managed ecosystems. Course helps students master the theory, quantitative methods, and interpretive skills that are needed to carry out applied research. *Prerequisite:* NRES 101 and one of the following: EEE 212, NRES 279 or a similar course, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

380. Fiber Theory and Textile Performance

Same as ACE 380. Examines chemical composition, polymer structure, and engineering potential of textile fibers; effect of chemical finishes and recycling procedures on performance characteristics of consumer textile products; and introduces physical and chemical metrology techniques useful for quality control and research purposes. *Prerequisite:* NRES 183 or CHEM 102 or 103. 4 hours or 1 unit.

381. Methods for Environmental Soil Chemistry

Application of laboratory techniques and analytical instruments to characterize soil and water properties in an environmental context. Includes atomic absorption, contaminant adsorption and desorption, ion-specific electrodes, surface area, immunoassay, and other methods. *Prerequisite:* NRES 101, CHEM 102 and 206. 3 hours or $\frac{3}{4}$ unit.

382. Functional Ecology of Trees

Same as PLBIO 382. See PLBIO 382.

383. Soil Mineralogy

Description and identification of common soil minerals and weathering of minerals; relationships of soil mineralogy to soil development, plant and animal ecology, and agricultural and technological use of soil. *Prerequisite:* NRES 101; GEOL 101 or 107. 3 hours or $\frac{3}{4}$ unit.

384. Introduction to Soil Physical Chemistry

Theoretical and practical aspects of soil physical chemistry, presented at an introductory level for majors in soil, earth, and natural resource sciences. Topics include introduction and review of principles of chemical thermodynamics, thermodynamics of clay swelling and ion exchange, surface chemistry, flow properties, use of physical methods in soil mineralogy, and oxidation and reduction processes. *Prerequisite:* One year of calculus; one year of chemistry. 3 hours or $\frac{3}{4}$ unit.

385. Methods in Soil Physical Chemistry

Laboratory course whereby selected methods used in soil physical chemistry will be taught to majors in soil, earth, and natural resource sciences. Topics include X-ray diffraction, water potential, specific surface area, rheology, and infrared, UV-visible, and Mossbauer spectrometers. *Prerequisite:* NRES 384; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

387. Soil Chemistry

Emphasizes the inorganic reactions involved in soil development and plant nutrition in soils; topics discussed include colloid systems, properties of water, ion exchange equilibria, plant nutrient forms, and methods of analyses. *Prerequisite:* NRES 101; CHEM 102. 3 hours or $\frac{3}{4}$ unit.

388. The Physics of the Plant Environment

The physics of transport processes in the soil and aerial environment of plants; exchanges of energy and gases in crop canopies and the retention of flow of water, gases, solutes, and heat in soils. *Prerequisite:* PHYS 101 or 106; one semester of calculus; and NRES 101 or consent of instructor. 4 hours or 1 unit.

390. Chemistry of Surface Water Systems

Lecture and computer laboratory course that examines how chemical and biological processes interact to govern the chemistry of streams, lakes, and wetlands and the response of aquatic organisms to pollution. Students will learn to apply chemical equilibrium and kinetic principles to analyze the behavior of these surface water systems through the use of models. Students will model field studies of important problems in environmental inorganic chemistry and biogeochemistry. The laboratory section will be devoted to instruction in the use of computer models and to their practical application. *Prerequisite:* CHEM 102; MATH 120 or consent of instructor. 4 hours or 1 unit. Students may not receive credit for both this course and CEE 343.

400. Graduate Seminar

Discussions of current research and specialized topics in natural resource and environmental sciences; a seminar must be given by all students in order to receive credit. 0 or $\frac{1}{4}$ unit. May be repeated to a maximum of $\frac{1}{2}$ unit. Required of all graduate students in NRES.

401. Special Problems

Individual studies or investigations in selected branches of natural resource and environmental sciences. 0 to 1 unit. No more than 2 units may be offered toward an MS degree.

402. Research Methods in Natural Resources

Treats the theory and practice of research methods in forestry. Provides an overview of experimental design and sampling techniques, and includes discussions that pertain to discipline-specific statistical methods used in forestry. *Prerequisite:* NRES 321 and 300- or 400-level courses in statistics; or consent of instructor. 1 unit.

405. Research Methods in Horticulture

Lectures, discussions, demonstrations, and laboratory exercises dealing with methods and apparatus used in horticultural research. *Prerequisite:* One year of general chemistry and one semester of general or plant physiology, or consent of instructor. 1 unit.

410. Discussions in Natural Resources and Environmental Sciences

Discussion of recent developments and current literature in the natural resources and environmental sciences, with a semester-long emphasis on a particular aspect of the subject matter. *Prerequisite:* Graduate standing in natural resources and environmental sciences or another related graduate degree program. $\frac{1}{4}$ or $\frac{1}{2}$ unit. May be repeated in separate semesters to a maximum of 1 unit.

414. Physical Chemistry of Clays and Soils

Same as CER E and MATSE 425. Application of physical-chemical principles and concepts to surfaces and adsorption on surfaces; Gouy-Chapman Theory, diffusion of ions, and thermodynamics of ion exchange; emphasis on silicate surfaces and water adsorption. *Prerequisite:* Consent of instructor. 1 unit. Offered in alternate years.

416. Biogeochemistry of Forest, Agricultural, and Aquatic Ecosystems

Advanced lecture and discussion of the biological, geological, and chemical processes of forest, agricultural, freshwater and marine ecosystems. The effects of pollutants and global change on each ecosystem type will be addressed along with the biogeochemical interactions among ecosystems. Each student will complete a detailed biogeochemical study for a particular ecosystem. *Prerequisite:* A 300-level course in two or more of the following areas: soil science, aquatic science, ecology, and hydrology; or consent of instructor. 1 unit.

424. Plant Biochemistry

Same as CPSC and PLBIO 424. See CPSC 424.

425. Membrane Transport and Mineral Nutrition in Plants

Same as CPSC and PLBIO 425. See CPSC 425.

435. Advanced Forest Biometry

Examines and discusses developments and techniques used in forest inventory, growth models, and ecological models. *Prerequisite:* NRES 321, CPSC 440, or consent of instructor. ½ unit. Offered in alternate years.

440. Public Involvement in Resource Management and Environmental Planning

Same as ENVST, L A, LEIST, R SOC, and U P 440. Current topics in public involvement in resource management and environmental planning. Topics include public involvement methods, theory, program evaluation, and needs assessment. Case studies of public involvement programs are used to illustrate concepts and methods. *Prerequisite:* Graduate standing and three hours of Social Science, or CPSC 236, or consent of instructor. ¾ or 1 unit.

446. Plant Gene Regulation

Same as CPSC 446. See CPSC 446.

463. Natural Resource Economics

Same as ACE 410, and ECON, and ENVST 463. See ACE 410.

468. Plant Pigments

Same as PLBIO 488. Comprehensive presentation of the nature, function, distribution, biosynthesis, degradation, separation, and spectroscopic properties of pyrrole, carotenoid, quinone, and anthocyanin pigments. *Prerequisite:* PLBIO 330 or consent of instructor. 1 unit. Offered in alternate years.

472. The Chemistry of Soil Fertility

The chemistry of the essential plant nutrients in soils, their reactions, and their quantitative relationship to plant growth. *Prerequisite:* NRES 101; CHEM 122. 1 unit. Offered in alternate years.

473. Pedogenesis and Soil Taxonomy

Historical review of soil genesis and classification; morphology and genesis of diagnostic soil horizons and features; soil genesis processes and reactions; classification of soils; and characteristics, geography, and production potentials of major soil groups of the world. *Prerequisite:* NRES 371 or 374, or GEOG 304. 1 unit. Offered in alternate years.

474. Physics of Flow Processes in Soil

The derivation and application of the fundamental physical principles and laws which govern the behavior of soils; emphasis on transport phenomena and physical characteristics of soils. *Prerequisite:* MATH 345, NRES 388, or consent of instructor. 1 unit. Offered in alternate years.

480. Physics of Transport Processes in Soils

Theoretical and practical aspects of modeling the environmental fate and transport of chemicals through unsaturated soil. Topics include spatial variability (scaling theories, geostatistics), fate and transport processes (adsorption, degradation, preferential flow, dispersion, advection, diffusion, volatility), and associated modeling (parameter estimation; screening regulatory and research models; including CDE, stochastic-convective, stream-tube, particle tracking, kinematic wave, stochastic continuum; with analytical and numerical methods). *Prerequisite:* NRES 388, and MATH 242 or 245 or consent of instructor. 1 unit.

481. Principles of Textile Characterization

Same as ACE 481. Examines textile metrology as a component of the production and use of textiles; includes case studies and investigative metrology. *Prerequisite:* NRES 380 and CPSC 340. 1 unit.

482. Textile Finishing: Theory and Development

Same as ACE 482. Examines developments in textile finishing technology to enhance the aesthetic and functional qualities of fibers and fabrics. *Prerequisite:* NRES 380 and CHEM 131; consent of instructor. 1 unit.

485. High Performance Fibers

Same as ACE 485. Investigation of textile fibers and fibrous systems for nonclassical applications, such as medicine and hygiene; protective apparel systems for heat and toxic chemicals; fiber reinforced components of building structures, transportation vehicles, sports equipment; and geotextiles. *Prerequisite:* NRES 380 and consent of instructor. 1 unit.

486. Soil Organic Matter

Basic considerations in organic matter transformation; geochemistry of organic matter; nature and origin of humic substances; and reactions of organic matter in soils and sediments. *Prerequisite:* Consent of instructor. 1 unit. Offered in alternate years.

490. Professionalism and Ethics in Agricultural and Natural Resource Science

Same as CPSC 490. See CPSC 490.

494. Professional Orientation in Natural Resources and Environmental Sciences

The philosophy and components of graduate education, with development of the principles useful in teaching, research, and extension in natural resource and environmental sciences. *Prerequisite:* Graduate standing in NRES. ¼ unit.

499. Thesis Research

Research may be conducted in various phases of natural resource and environmental sciences; subject must be approved by departmental committee. 0 to 3 units.

NAVAL SCIENCE

Head of Department: R. J. Scott, Captain, USN
Department Office: 236 Armory Building, 505 East Armory Avenue, Champaign
Phone: 333-1061

URL: www.uiuc.edu/colleges/naval_science

Note: Students considering enrollment in Military Science, Naval Science, or Air Force Aerospace Studies courses should be aware that University policy prohibits discrimination on the basis of sexual orientation; students may enroll in these courses regardless of sexual orientation. Students seeking to enroll in ROTC are not asked to disclose their sexual orientation. However, homosexual conduct is grounds for disenrollment from the program.

Naval Science (N S)**100. Naval Science Laboratory**

Noncredit course designed to give the Naval ROTC student, through practical application, a better grasp of the naval science subjects taught in the classroom and a working knowledge of close order drill. 0 hours.

101. Introduction to Naval Science

Naval organization and management practices examined within the context of the naval service; command and control, organization for logistics, service and support, functions, and services of major components of the Navy and Marine Corps, and shipboard organization; and emphasis on management and leadership functions. *Prerequisite:* Consent of instructor. 2 hours.

102. Sea Power and Maritime Affairs

Investigates the characteristics of sea power and their impact on the affairs of our nation; discusses those characteristics with historical and modern applications to the United States and other world powers. 2 hours.

121. Naval Weapons Systems

Introduction to concepts of naval weapons systems, their capabilities and limitations, and their individual and complementary roles in a wide variety of offensive and defensive situations. *Prerequisite:* Consent of instructor. 3 hours.

122. Introduction to Naval Engineering

Studies ship compartmentation, propulsion systems, auxiliary power systems, interior communications, and ship control; types, structure, and purpose of naval ships; and examination of elements of ship design and ship stability. *Prerequisite:* Consent of instructor. 3 hours.

231. Navigation and Naval Operations, I

Provides the student with an understanding of the theory and techniques of the three types of marine (nautical) navigation: piloting, electronic, and celestial. *Prerequisite:* N S 101 or consent of instructor. 3 hours.

232. Navigation and Naval Operations, II
Designed to give an understanding of the concepts and use of relative motion principles, international maritime law and the rules of the nautical road, and the fundamentals of U. S. fleet organization, communication, and operations. *Prerequisite:* N S 231 or consent of instructor. 3 hours.

242. Naval Leadership and Management
Provides the student of how personal value systems and external ethical requirements effect their leadership styles. Examines Navy organization, personnel administration procedures, human resource management programs, and military justice in terms of current management theory. *Prerequisite:* B ADM 210, or consent of instructor. 2 hours.

291. Evolution of Warfare
Survey of the evolution of warfare emphasizing the philosophies and trends which have been significant in land warfare. 3 hours.

293. History of Amphibious Warfare
Studies amphibious operations and the evolution of amphibious warfare doctrine and development. *Prerequisite:* Advanced undergraduate standing or consent of instructor. 3 hours.

NEUROSCIENCE

Program Chair: William Greenough
Program Office: 393 Morrill Hall, 505 South Goodwin Avenue, Urbana
Phone: 244-0052
URL: www.life.uiuc.edu/neuroscience

Neuroscience (NEURO)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

303. Introduction to Neurobiology
Same as BIOL 303. See BIOL 303.

304. Cognitive Neuroscience
Same as PSYCH 304. See PSYCH 304.

311. Laboratory in Physiological Psychology
Same as PSYCH 311. See PSYCH 311.

312. Cellular and Molecular Neurobiology
Same as CSB 312. See CSB 312.

313. Psychopharmacology
Same as PSYCH 313. See PSYCH 313.

314. Brain, Learning, and Memory
Same as PSYCH 314. See PSYCH 314.

315. Structure and Function of the Nervous System
Same as CSB 307 and PHYSL 315. See PHYSL 315.

316. Integrative Neurophysiology
Same as PHYSL 316. See PHYSL 316.

317. Methods in Computational Neurobiology
Same as BIOEN 376, BIOPH and PHYSL 317. See PHYSL 317.

320. Principles of Psychophysiology
Same as PSYCH 320. See PSYCH 320.

323. Memory and Amnesia
Same as PSYCH 303. See PSYCH 303.

324. Neurobiology of Vision
Same as PSYCH 312. See PSYCH 312

325. Human Neuropsychology
Same as PSYCH 315. See PSYCH 315.

343. Hormones and Behavior
Same as EEE 353 and PSYCH 343. See PSYCH 343.

405. Neurochemistry
Same as PHYSL and PSYCH 405. See PSYCH 405.

410. Advances in Psychobiology: Introduction for Graduate Students
Same as PSYCH 410. See PSYCH 410.

411. Advanced Physiological Psychology
Same as PSYCH 411. See PSYCH 411.

416. Neurophysiology Laboratory
Same as PHYSL 416. See PHYSL 416.

420. Advanced Topics in Neural and Behavioral Biology
Survey of current research in modern neural and behavioral biology. Each weekly seminar is presented by a faculty member or distinguished visiting neuroscientist. Abstracts and suggested readings are presented prior to each seminar. *Prerequisite:* Enrollment in Neuroscience Program or consent of instructor. ¼ unit.

487. Human Neuroscience
Same as CSB 487. See CSB 487.

490. Individual Topics in Neuroscience
Individual topics of research supervised by Neuroscience faculty. Usually taken in one of the eight Neuroscience concentration areas: 1) neuroanatomy, 2) neurophysiology, 3) cognitive and behavioral neuroscience, 4) neurochemistry, neuropharmacology and neurotoxicology, 5) neuroendocrinology and neuroimmunology, 6) developmental genetic and molecular neuroscience, 7) clinical and biomedical neuroscience, 8) computational neuroscience. Typically taken by students before they choose their thesis topic. *Prerequisite:* Consent of instructor. ½ to 2 units. May be repeated in the same or subsequent semesters to a maximum of 4 units.

491. Artificial Neural Networks and Computational Brain Theory
Same as PHYSL 491. Interdisciplinary graduate/faculty seminar addressing unresolved issues in neuroscience, cognitive science, and distributed artificial intelligence, which concern the functional design of the nervous system and the construction of large-scale, bio-

logically inspired artificial neural network systems. *Prerequisite:* Graduate standing or consent of instructor. ¼ unit. Approved for S/U grading.

499. Thesis Research
Research on the thesis topic and preparation of the thesis. *Prerequisite:* Consent of instructor. 0 to 4 units. May be repeated in the same or subsequent semesters to a maximum of 4 units.

NUCLEAR ENGINEERING

Head of Department: James F. Stubbins
Department Office: 214 Nuclear Engineering Laboratory, 103 South Goodwin Avenue, Urbana
Phone: 333-2295
URL: www.ne.uiuc.edu

Nuclear Engineering (NUC E)

100. Orientation to Nuclear Engineering
Introduces the entering freshman to the department and to the nuclear engineering profession. Initially students are given hands-on campus computer experience in word processing, spread sheet, and graphics, which are applied to layout their eight semester curriculum sequence and for the laboratory report. Several demonstrations of nuclear phenomena are presented and discussed (reactor operation, plasma behavior, and others). Two experiments are conducted on radioactive decay and radiation shielding, and one is submitted as a formal, written laboratory report by the students. 1 hour.

101. Introduction to Energy Sources
Explains energy technologies using an elementary approach which pre-supposes no prior scientific or technical background. Examines all present and potential future energy sources including fossil fuel, solar, hydro, and nuclear power. Demonstrations, a tour of the University's power plant, and a tour of the reactor on campus are integral parts of the course. Energy related incidents will be discussed as well, including their environmental, economic, social impact, technologies, and physical principles. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Energy Systems
Examines patterns of energy production and utilization and discusses the technical aspects of renewable energy resources, advanced fossil fuel systems, and advanced nuclear systems. *Prerequisite:* MATH 120 or 135; PHYCS III. 2 or 3 hours.

241. Introduction to Radiation Protection
Same as ENVST 241. Introductory course in the elements of radiation protection and health physics, emphasizing practical appli-

cations. *Prerequisite:* MATH 120 or equivalent; and one semester of biology, chemistry, and physics, or consent of instructor. 2 hours. Seniors in nuclear engineering may not receive credit for NUC E 241.

247. Introduction to Modelling Nuclear Energy Systems

Applications of elementary nuclear physics in nuclear engineering. Nuclear reactor materials and components. Steady-state and transient operation of nuclear reactors. Nuclear energy removal and conversion. Radiation shielding. *Prerequisite:* PHYCS 112, MATH 245 or 242; co-registration in MATH 285. 3 hours.

290. Special Topics

Considers selected areas which are of current interest to undergraduates in nuclear engineering but which are not adequately covered in other formal courses. *Prerequisite:* Consent of instructor. 1 to 4 hours.

295. Special Problems

Individual investigations or studies of any phase of nuclear engineering selected by the student and approved by the department. *Prerequisite:* Senior standing or consent of instructor. 1 to 4 hours. May be repeated.

302. Nuclear Power Engineering

Same as M E 302. Principles of release and utilization of fission energy in nuclear power engineering; includes such topics as fission processes and controlled chain reactions; nuclear reactor types, design principles, and operational characteristics; power reactor design criteria; radiation hazards and radioactive waste treatment; economics; and other applications such as propulsion and research reactors. Students who plan to take more extensive training in nuclear technology are advised to take the NUC E 247–NUC E 346 sequence. *Prerequisite:* Consent of instructor. 3 hours or 1 unit. Credit for both NUC E 302 and NUC E 247 cannot be given toward the same degree.

312. Nuclear Power Economics and Fuel Management

Quantitative analysis of the impact of the nuclear power industry; nuclear fuel cycle and capital costs for thermal and fast reactors; optimization of the use of nuclear fuels to provide the lowest energy costs and highest system performance; and comparison between fossil fuel systems, fission systems, and controlled thermonuclear systems. *Prerequisite:* Junior standing; M E 302, or NUC E 302 or 247, or consent of instructor. 3 hours or 1 unit.

321. Plasma and Fusion Science

Same as ECE 321 and PHYCS 365. Course provides an introduction to the physics of plasmas, including particle and fluid descriptions, waves, collisions, stability, and confinement, with applications to controlled thermonuclear fusion reactors, problems in fusion engineering, and astrophysics. *Prerequisite:* Junior standing in the College of Engineering or consent of instructor. 3 hours or $\frac{3}{4}$ units.

323. Plasma Laboratory

Laboratory experiments relating to plasma engineering and fusion energy will be conducted in small groups by the students. Top-

ics in ultra-high vacuum technology rf and dc electric plasma probes, measurements of dc and pulsed magnetic fields, dynamics of a theta pinch, and laser interferometry to measure plasma density, may all be included. *Prerequisite:* NUC E 321, 351, credit or concurrent registration in NUC E 352, or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

329. Plasma Engineering

Course covers the basic principles and examples for adapting and applying the plasma state to solve a number of modern engineering problems. These include the plasma processing of materials for microelectronics and other uses, lighting, plasma displays, and other technologies. *Prerequisite:* Intermediate Electricity and Magnetism at the level of ECE 229 or PHYCS 335. 3 hours or $\frac{3}{4}$ units.

331. Materials in Nuclear Engineering

Develops a materials engineering background in the context of nuclear systems and radiation applications; relates structure of materials to their physical and mechanical properties; develops phase formation and reaction kinetics from basic thermodynamics principles; develops an understanding of charged particle interactions with surfaces; develops transport concepts of neutral and charged particles in matter; discusses materials performance in nuclear and radiation applications, including radiation damage and effects. *Prerequisite:* Junior standing in engineering or the physical sciences. 3 hours or $\frac{3}{4}$ units. Credit not given for both NUC E 331 and MATSE 346.

332. Nuclear Engineering Materials Laboratory

Laboratory experiments relating to materials applications in nuclear engineering and energy systems will be conducted in small groups. Topics in room and elevated temperature mechanical properties of structural materials, corrosion, physical properties, radiation damage and effects, and materials selection in design will be included. *Prerequisite:* Credit or concurrent registration in NUC E 331 or equivalent. 2 hours or $\frac{1}{2}$ unit.

335. Principles of Imaging with Ionizing Radiation

Techniques used to generate ionizing radiation useful in the imaging of solids and medical imaging will be studied. The theory and applications of biological and medical imaging modalities that use ionizing radiation will be covered. This includes x-ray diagnostic methods such as plain film, and digital, computer axial tomography (CAT) and radionuclide imaging techniques such as positron emission tomography (PET), single photon emission computed tomography (SPECT) and gamma cameras. It will also cover the theory and applications of materials imaging. These include x-ray, electron, and neutron diffraction, in addition to small angle neutron and x-ray scattering (SANS, and SAXS). *Prerequisite:* NUC E 346 or consent of instructor. 3 hours or $\frac{3}{4}$ units.

341. Principles of Radiation Protection

Sources of nuclear radiation; ionization and energy deposition in matter with an emphasis on biological systems; principles of dosimetry;

determination of exposure and limits for internal and external emitters; basic shielding calculations. *Prerequisite:* NUC E 346 or consent of instructor. 3 hours or $\frac{3}{4}$ units.

342. Radioactive Waste Management

Sources and characteristics of radioactive wastes; methods of treatment; monitoring techniques; methods of hazard evaluation; special aspects of solid, liquid, and gaseous wastes; and disposal, both temporary and permanent. *Prerequisite:* NUC E 346 or equivalent. 2 hours or $\frac{1}{2}$ unit.

344. Nuclear Analytical Methods Laboratory

Nuclear analytical methods and techniques are covered in depth. Emphasis is placed on neutron activation analysis, energy dispersive x-ray fluorescence and particle spectroscopy. A laboratory session is given using the methods relevant to everyday trace element analysis. *Prerequisite:* CHEM 101, NUC E 346, or equivalent. 2 to 3 hours, or $\frac{1}{2}$ to $\frac{3}{4}$ unit. Students that have taken NUC E 351 or equivalent may only take this course for 2 hours, or $\frac{1}{2}$ unit credit.

346. Principles and Applications of Radiation Interactions with Matter, I

Experimental and theoretical foundations of interaction of neutrons, photons, and charged particles with matter. Emphasis on topics that underlie the following applications; radiation detection, biological effects and radiation dosimetry, radiation damage and nuclear materials, neutron activation analysis, and fission and fusion energy systems. Classical theory of charged particle cross sections. Introductory quantum mechanics. Exact and numerical solutions of the Schroedinger equation. Quantum theory of cross sections. Photon interactions with atomic electrons and nuclei. Radioactive-series decay. Computer assignments illustrate fundamental concepts. *Prerequisite:* PHYCS 114 and MATH 285 or MATH 341, MATH 280 or concurrent registration in MATH 280, or equivalent. 3 hours or $\frac{3}{4}$ unit. Not available for graduate credit to nuclear engineering students.

347. Principles and Applications of Radiation Interactions with Matter, II

Continuation of NUC E 346. Quantum theory of ionization of matter by charged particles. Nuclear models and structure. Alpha decay, fission and fusion reactions. Beta and gamma decay. Nuclear reactions. Radiation damage effects. Special topics. Computer assignments to illustrate fundamental concepts. *Prerequisite:* NUC E 346 or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

348. Nuclear Systems Engineering and Design

Engineering principles that underlie nuclear systems designed with emphasis on nuclear power reactors. Materials for nuclear systems. Energy generation and removal in single- and two-phase flows. Reactor and component control systems and nuclear fuel reloading patterns. *Prerequisite:* NUC E 355; M E 205; MATH 285 and 280. 3 hours or $\frac{3}{4}$ unit.

351. Nuclear Engineering Laboratory
Radiation detection and instrumentation; radiation dosimetry and shielding; basic measurements in nuclear engineering; engineering applications; and microcomputer data acquisition and experimental control. *Prerequisite:* NUC E 346 or equivalent. 3 hours or $\frac{3}{4}$ unit.

352. Nuclear Engineering Laboratory
Five-week laboratory course comprising the required core of nuclear engineering experiments. One experiment in each of the following areas is included: reactor operation, D. D. glow discharge plasma, subcritical assembly. *Prerequisite:* NUC E 321, 351, and 355 or consent of instructor. 1 hour or $\frac{1}{4}$ unit. May be taken concurrently with NUC E 323, 332, 344, or 353.

353. Nuclear Reactor Laboratory and Operations
Laboratory experiments relating to nuclear reactor physics and fission reactor operations, conducted in small groups, including: reactor instrumentation, flux and power measurements, start-up procedures, reactivity worth measures, reactor period, and control rod calibration experiments, and measurements in subcritical, critical, and supercritical systems. *Prerequisite:* NUC E 351, and credit or concurrent registration in NUC E 352. 2 hours or $\frac{1}{2}$ unit.

355. Reactor Statics and Dynamics
Intermediate-level analysis of thermal and fast reactor assemblies; reactor statics, reactor dynamics, and introductory transport theory; homogeneous and heterogeneous reactors; and multigroup diffusion theory, perturbation theory, reactivity coefficients, and control rod analysis. *Prerequisite:* NUC E 247 or equivalent, or consent of instructor. 4 hours or 1 unit.

357. Safety Analysis of Nuclear Reactor Systems
Same as CSE 362. Basic safety philosophy in nuclear reactor systems; brief review of nuclear reactor systems; regulatory processes; siting considerations; safety problems related to reactor dynamics; evaluation of postulated accidents; risks associated with nuclear fuel cycle; and methods of systems safety analysis. *Prerequisite:* NUC E 302 or 247 or equivalent, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

358. Design in Nuclear Engineering
Introduction to design in nuclear engineering systems; basic principles of definition, organization, constraints, modeling and optimization of system design; case studies; and class design projects applying these basic principles. *Prerequisite:* NUC E 247 and 348. 4 hours or 1 unit.

390. Intermediate Special Topics
Considers selected areas of current interest in nuclear engineering which are not adequately covered in other formal courses. *Prerequisite:* Consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

401. Fundamentals of Nuclear Engineering
Lecture and problem course to provide background for further work in nuclear engineering; problems in materials, heat

transfer, and fluid flow; and special emphasis on basic ideas and the mathematical similarity of problems in heat transfer, fluid flow, and neutron diffusion. *Prerequisite:* MATH 285, NUC E 247, and NUC E 346, or equivalent, or equivalent or consent of instructor. 1 unit.

411. Nuclear Reactor Heat Transfer
Selected topics in nuclear reactor heat transfer: thermal analysis of fuel elements under steady and transient operation; convective energy transport from reactor cores; two-phase flow and boiling in reactor cores; and liquid metal coolant systems. *Prerequisite:* NUC E 401 or consent of instructor. 1 unit.

421. Interaction of Radiation with Matter
Topics in the interaction of radiation with matter of interest to the nuclear engineering field: the kinematics, kinetics, and cross sections involved in the interaction of charged particles, electromagnetic radiation, and neutrons. *Prerequisite:* NUC E 346 or equivalent. 1 unit.

422. Controlled Fusion Systems, I
Same as ECE 422. Development of plasma models for fusion analysis; treatment of plasma heating and confinement with applications to current experiments; energy balances; and energy extraction. *Prerequisite:* NUC E 321 or consent of instructor. 1 unit.

423. Controlled Fusion Systems, II
Development of plasma models for high-beta pulsed-fusion systems and for pellet fusion systems; heating and confinement mechanisms; energy balances and energy extraction; and applications to current experiments. *Prerequisite:* NUC E 422 or consent of instructor. 1 unit.

425. Nuclear-Electrical Energy Conversion
Same as ECE 425. Advanced concepts in nuclear radiation energy conversion of importance in both power production and radiation detection; analysis and applications of direct collection of charged particles; and theory and applications of radiation-induced ionization and excitation. 1 unit.

431. Nuclear Metallurgy
Metallurgical principles applied to materials problems in nuclear engineering; includes topics in production of uranium, corrosion, radiation damage, fuel element fabrication, and fuel reprocessing. *Prerequisite:* Consent of instructor. 1 unit.

441. Nuclear Radiation Shielding
Basic concepts, radiation sources, elementary gamma ray and neutron shielding, geometry factors in shielding, advanced techniques (such as Monte Carlo and discrete ordinates), special topics (such as shield heating, duct streaming, and albedo theory), and practical aspects. *Prerequisite:* NUC E 341 or consent of instructor. 1 unit.

454. Nuclear Engineering Laboratory Investigations
Individual investigation in nuclear engineering. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 2 units.

455. Reactor Theory, I
Same as PHYCS 455. Advanced development of neutron transport theory; neutron slowing-down and resonance absorption; approximations to the transport equation; direct numerical methods and other techniques of approximation theory applied to the neutron transport equation; and advanced topics. *Prerequisite:* NUC E 355, graduate standing in physics, or consent of instructor. 1 unit.

456. Reactor Theory, II
Same as PHYCS 456. Advanced treatment of the theory of slow-neutron scattering, neutron thermalization, Doppler broadening, fuel depletion and fuel loadings, properties of neutron migration operators, and mathematical neutron transport theory; interpretation of related experiments; and advanced topics. *Prerequisite:* NUC E 455; NUC E 421 or graduate standing in physics; or consent of instructor. 1 unit.

458. Advanced Nuclear Engineering Design
Classroom exercise in the conceptual design of a nuclear engineering system involving a synthesis of previous learning in the field of nuclear engineering and related disciplines; the design includes all necessary ingredients for the system, such as core, thermal-hydraulics, shielding, material selection, and control. *Prerequisite:* Five 300- and/or 400-level nuclear engineering courses including NUC E 247, 348 and 401, or equivalent; or consent of instructor. 1 unit.

459. Asymptotics and Singular Perturbations in Engineering and Physics
Same as MATH, PHYCS, and T A M 459. See T A M 459.

460. Reactor Kinetics and Dynamics
Diffusion and transport neutron balances with delayed neutrons; formal development of the point reactor kinetics equations; analytic and numerical solutions of the point reactor kinetics equations; space-dependent, multigroup reactor kinetics; reactivity measurements; reactor noise analysis; and advanced topics. *Prerequisite:* NUC E 455 or consent of instructor. 1 unit.

490. Special Topics
Considers selected areas of current interest in research which are not adequately covered in other courses. *Prerequisite:* Consent of instructor. $\frac{1}{2}$ or 1 unit.

495. Nuclear Engineering Problems
Individual study in areas of nuclear engineering and closely related fields not covered by regular course offerings. The work is carried out under the supervision of a member of the faculty. *Prerequisite:* At least 3 units of graduate work; consent of instructor. $\frac{1}{4}$ to 2 units.

497. Seminar in Nuclear Science and Engineering
Lectures and discussions on current work in research and development in nuclear engineering and related fields by staff, advanced students, and visiting lecturers. 0 or $\frac{1}{4}$ unit.

499. Thesis Research
0 to 4 units.

NURSING

Director: Carol S. Humpherys
Program Office: 408 South Goodwin Avenue, Urbana
Phone: 333-2507
URL: www.nurs.uic.edu/regions/urbana.htm

Including Medical-Surgical Nursing (NUMS), Nursing Sciences (NUSC), Psychiatric Nursing (NUPS), and Public Health Nursing (NUPH)

The following courses are offered in the University of Illinois at Chicago College of Nursing undergraduate generic program, baccalaureate completion, and family nurse practitioner graduate programs on the Urbana-Champaign campus. Although these courses are a part of the undergraduate and graduate offerings of the College of Nursing at the Chicago campus, which has ultimate responsibility for them, under a cooperative arrangement they are being offered on the Urbana-Champaign campus as well. The graduate offerings are part of the Graduate College at the Chicago campus.

Note: In the following courses with the exception of NUSC 100, enrollment is limited to students in the College of Nursing. NUSC 100 is open to non-nursing and nursing students.

Medical-Surgical Nursing (NUMS)

356. Nursing Care of the Patient with Pain
 Pain theory, assessment and treatment strategies; physical, psychological, and spiritual dimensions of the pain experience. The nursing implications and current research of pain theory. 2 hours.

Public Health Nursing (NUPH)

500. Health Maintenance and Promotion in Primary Care Nursing
 First of a three-course sequence to prepare nurse practitioners to provide primary care to well families and individuals. *Prerequisite:* Proficiency in health assessment and consent of instructor. 4 hours.

515. Advanced Nursing Management in Community-Focused Health Services
 Theory and research in leadership, management, and community-focuses assessment for advanced nursing practice in complex and integrated health systems. *Prerequisite:* Graduate standing and NUSC 528, or consent of instructor. 3 hours.

516. Evaluation of Health Services Outcomes for Nursing
 Explores program planning and evaluation in community-focused health services. Includes

measurement of quality, performance, and impact on health programs and services. Emphasis is on interdisciplinary perspective. Addresses integrated quality improvement systems. *Prerequisite:* NUPH 515 or consent of instructor. 3 hours.

524. Primary Care Nursing of Acute and Chronic Disorders, I

First of a two-course sequence designed to prepare nurse practitioners to assess, diagnose, and manage stable chronic conditions and acute episodic illnesses. *Prerequisite:* NUPH 500 and NUSC 531. 4 hours.

525. Primary Care Nursing of Acute and Chronic Disorders, II

Second of a two-course sequence designed to prepare nurse practitioners to assess, diagnose, and manage stable chronic conditions and acute episodic illnesses. *Prerequisite:* Graduate standing and NUPH 524. 6 hours.

528. Advanced Clinical Practice in Primary Care Nursing

Health care issues, advanced clinical skills, and supervised practicum experiences specific to students' selected practice area or population groups in rural, urban, or international settings. *Prerequisite:* Graduate standing and NUPH 524. 1 to 5 hours. Approved for S/U grading only.

Psychiatric Nursing (NUPS)

450. Women and Mental Health

Theories of female psychology; women's daily lives and mental health; sex differences in mental illness; strategies for improving women's mental health in nursing and other fields. *Prerequisite:* Consent of instructor. 3 hours.

Nursing Sciences (NUSC)

100. Orientation to Professional Nursing
 Orientation course on nursing as a career with professional roles, responsibilities, and knowledge. 1 hour. Required of all generic program students.

202. Concepts and Processes of Professional Nursing

Introduction to the history and framework of nursing practice. Emphasis on basic curricular concepts and processes of professional nursing. *Prerequisite:* NUSC 100. 3 hours.

204. Cultural Health Issues through the Life Span

Multicultural approach to growth and development across the lifespan. Ethnicity, ethnocentrism, physical growth, maturation, and variation discussed within a framework of person(s), health, and environment. *Prerequisite:* PSYCH 100 and SOC 100 or the equivalent; NUSC 100 or consent of instructor. 3 hours.

206. Personal Health and Wellness

Principles of primary health care and health promotion, emphasizing nutrition, personal health risk reduction, stress, and coping. Introduces prevention and risk reduction strategies. *Prerequisite:* NUSC 100. 3 hours.

210. Health Assessment

Introduction to assessment of physical and psychosocial health across the lifespan. Includes physical assessment techniques and interviewing skills. *Prerequisite:* Credit or concurrent registration in KINES 252, or the equivalent; and in NUSC 202. 3 hours.

212. Nursing Pharmacology

Pharmacological principles required for nursing practice. Use and mode of action of different drug categories. Case study application to nursing practice. *Prerequisite:* CHEM 130 and KINES 252, or equivalent courses. 3 hours.

214. Clinical Pathophysiology, I

Surveys clinical pathophysiological mechanisms which cause disruption of normal physiologic processes across the life span. Part I. *Prerequisite:* CHEM 130, and KINES 252, or equivalent courses. 2 hours.

216. Clinical Pathophysiology, II

Surveys clinical pathophysiological mechanisms which cause disruption of normal physiologic processes across the life span. Part II. *Prerequisite:* NUSC 214. 2 hours.

218. Nursing Information Management

Introduction to health, nursing, and management information systems. Computerized methods for collecting, storing, and manipulating information. Laboratory experience related to basic computer utilization. *Prerequisite:* NUSC 202, and concurrent registration in NUSC 242. 2 hours.

222. Introduction to Nursing Research and Statistics

Basic concepts of research emphasizing relationship between research and nursing practice. Includes basic statistical measures, hypothesis testing, and interpretation of nursing research. *Prerequisite:* NUSC 202, or concurrent registration in NUSC 242. 4 hours.

225. Clinical Nursing, I: Clinical Concepts

Applies nursing process, communication and teaching/learning to individuals. Includes mobility, comfort, safety, infection, protection, fatigue, sleep, oxygenation, elimination. Clinical application in various settings. *Prerequisite:* NUSC 210, and NUSC 212, and concurrent registration in NUSC 216. 6 hours.

242. Transition to Professional Nursing

Introduces RN/BSN student to major curricular concepts and processes, with emphasis on cultural diversity, health promotion, and professional nursing practice. *Prerequisite:* Credit or concurrent registration in NUSC 210, or consent of instructor. 3 hours.

289. Cooperative Education

Satisfactory/unsatisfactory grade only. Opportunities for students to enhance clinical skills and explore professional nursing roles. Students will contract with an approved health care agency for a salaried position. *Prerequisite:* Enrollment in the Cooperative Education Program in Nursing. 0 hours.

321. Nursing Perspectives on Health Policy and Politics

Health policy issues are analyzed from socio-economic, political, and ethical perspectives and their relation to policy process and health care delivery. Nurse political participation to influence policy is explored. *Prerequisite:* NUSC 100, 202, and 225. 2 hours.

335. Clinical Nursing, II: Adult Health

Nursing concepts concerning common adult health problems: oxygenation, information processing, regulation, immune response, elimination, metabolism, mobility, substance abuse and addiction. Clinical application in various settings. *Prerequisite:* NUSC 225. 6 hours.

345. Clinical Nursing, III: Child-Bearing Family

Nursing care of the childbearing family including antepartal, intrapartal, and postpartal concerns. Focus on normal processes including parenting. Clinical application in various settings. *Prerequisite:* Credit or concurrent registration in NUSC 335. 5 hours.

355. Clinical Nursing, IV: Child Health

Nursing care of the well, acutely and chronically ill, infant and child using a family focused approach. Clinical application in various settings. *Prerequisite:* NUSC 335. 5 hours.

360. Continuity of Care

The interface between the health care system and person(s) with chronic health problems, disability, and/or wellness needs will be examined. Clinical application in various settings. *Prerequisite:* Credit or concurrent registration in NUSC 335 or 345. 3 hours.

365. Clinical Nursing, V: Mental Health

Application of biopsychosociocultural concepts to understand a person's vulnerability to mental illness and adaptation to stressors. Students plan and implement strategies. Clinical application in various settings. *Prerequisite:* NUSC 335. 5 hours.

375. Clinical Nursing, VI: Older Adult Health

Application of concepts of gerontology, aging theories and care of the older adult, including biological, psychological, and social aspects. Clinical application in various settings. *Prerequisite:* NUSC 335. 3 hours.

385. Synthesis, I: Primary/Community Health Nursing

Emphasis placed on primary health care utilizing the principles of health promotion and epidemiology. Clinical application in various settings; including clinical validation for advanced placement students. *Prerequisite:* Credit or concurrent registration in NUSC 350, 345, 355, 365, and 375, or consent of instructor. 5 hours.

390. Nursing Management and Leadership in Health Care Systems

Theoretical and practical knowledge relevant to the nurse manager and leader role in health care delivery. Clinical application coordinated with NUSC 395. *Prerequisite:* Concurrent registration in NUSC 395. 5 hours.

392. Professional Development in Nursing

Focuses on entry to practice issues, policy development, legal aspects, and current and future factors affecting nursing and health care. Professional practice and career development. *Prerequisite:* Completion of Clinical Nursing courses: NUSC 225, 335, 345, 365, and 375. 2 hours.

394. Special Topics: Undergraduate

Discusses selected topics of current interest. Offered according to sufficient student demand and instructor availability. *Prerequisite:* Completion of Level II courses and consent of instructor. 1 to 4 hours. May be repeated in same or separate semesters as topics vary.

395. Synthesis, II: Nursing of Clients with Complex Health Problems

Synthesis of concepts relevant to nursing care of person(s) with complex health problems across the lifespan. Clinical application in various settings. *Prerequisite:* NUSC 385, and concurrent registration in NUSC 390. 5 hours.

399. Independent Study: Undergraduate

Individually arranged study of student selected topic under guidance of individual instructor. *Prerequisite:* Completion of Level II courses and consent of instructor. 0 to 5 hours. May be repeated for credit and may register for more than one section per term.

494. Special Topics: Masters

Discusses selected topics of current interest. Offered according to sufficient student demand and instructor availability. *Prerequisite:* Consent of instructor. 1 to 3 hours.

526. Nursing Inquiry, I

First of a two-course sequence on the process and application of nursing inquiry; emphasizes approaches to inquiry, theory analysis, constructs, measurement, and theory generation. *Prerequisite:* Graduate standing and credit or concurrent registration in NUSC 525; or the equivalent. 2 hours.

527. Nursing Inquiry, II

Continuation of NUSC 526, emphasizing the methods of theory development and theory testing in selected areas of nursing sciences. Ethical issues in research. *Prerequisite:* Graduate standing and NUSC 526. 2 hours.

528. Health, Environment, and Systems

Examination of international, national and local environments for health, health systems, health policy, and their outcomes. Influence of social, cultural, and ethical factors. *Prerequisite:* Graduate standing. 2 hours.

529. Issues of Advanced Practice in Nursing

Examines advanced practice in nursing from historical, contemporary, and future dimensions. *Prerequisite:* Graduate standing and NUSC 528. 1 hour. May be repeated to a maximum of 2 hours for students enrolled in specific nursing concentrations. Students may register for more than one section per term.

530. Physiologic Basis of Nursing Practice across the Life Span

Advanced contemporary physiologic principles and their relevance to clinical practice.

Content topics will include developmental (life span) physiologic changes. *Prerequisite:* Graduate standing and an undergraduate physiology course; or consent of the instructor. 4 hours.

531. Pharmaceutical Intervention in Advanced Practice in Nursing

Advanced principles of pharmaceutical intervention. Includes legal issues, client adherence, medication selection factors, and applications to sub-specialty populations. *Prerequisite:* Graduate standing and credit or concurrent registration in NUSC 530, or the equivalent; or consent of instructor. 2 or 3 hours. Students registering for 3 credit hours register for two extra laboratory-discussion hours per week.

532. Comprehensive Health Assessment for Advanced Practice

Includes physical, psychosocial, developmental, occupational, sexual, cultural assessments across the life spans; emphasizing differences between normal and abnormal. Synthesize results in client's health status. *Prerequisite:* Graduate standing and NUSC 210, or the equivalent; or consent of instructor. 2 or 3 hours. Students registering for 3 credit hours register for two additional laboratory-discussion hours per week.

595. Seminar in Nursing

Identifies and analyzes a broad range of issues related to modern nursing and nursing research. Topics will vary according to student interests and instructor availability. *Prerequisite:* Consent of instructor. 1 to 3 hours.

596. Independent Study: Graduate

Selected problems in nursing are investigated under the direction of a graduate faculty member. Modes of investigation are determined by the nature of the nursing problem selected. *Prerequisite:* Consent of instructor. 0 to 4 hours.

597. Project Research: Masters

Master's student project research. *Prerequisite:* Consent of instructor. 0 to 16 hours.

598. Thesis Research: Masters

Master's student thesis research. *Prerequisite:* Consent of instructor. 0 to 16 hours.

NUTRITIONAL SCIENCES

Director: Sharon M. Donovan
 Program Office: 449 Bevier Hall, 905 South Goodwin Avenue, Urbana
 Phone: 333-4177
 URL: w3.aces.uiuc.edu/nutrsci

Nutritional Sciences (NUTRS)

320. Nutritional Aspects of Disease
 Same as FSHN 320. See FSHN 320.

326. Human Nutritional Biochemistry, I
Same as FSHN 326. See FSHN 326.

327. Human Nutritional Biochemistry, II
Same as FSHN 327. See FSHN 327.

328. Community Nutrition
Same as FSHN 328. See FSHN 328.

400. Nutritional Sciences Seminar
Discussions of current problems in nutritional sciences. *Prerequisite:* NUTRS 410 and consent of instructor. 0 or ¼ unit. Required of all graduate students in the nutritional sciences program.

410. Current Topics in Nutritional Research
Same as ANSCI and FSHN 410. Series of one-third semester intensive courses on current topics in nutritional sciences research, in areas of principles of nutrition, physiology of nutrition, diet, and disease prevention. Cover topics such as: nutrition regulation, dietary fiber, nutrition and cancer, design of nutrition experiments, nutritional toxicology, nutrition and gene expression. *Prerequisite:* BIOCH 350 or equivalent and a graduate level course in nutrition. ¼ to ¾ unit. Student may register for this course more than once in the same term to a maximum of ¾ unit.

411. Comparative Regulation of Macronutrient Metabolism
Same as ANSCI and FSHN 411. Biochemical aspects of nutrition with emphasis on the function, regulation, and metabolism of macronutrients in higher animals, including humans. *Prerequisite:* BIOCH 350 or 352 and an upper division course in nutrition. 1 unit.

450. Protocols in Clinical Nutrition
Design and implementation of experimental protocols in human nutrition. Examines the scientific, regulatory, and ethical context for conducting research in clinical nutrition. The focus of the course will be the writing and evaluation of a simulated peer-reviewed grant proposal. *Prerequisite:* NUTRS 326, 327 or equivalent; two semesters of statistics recommended; NUTRS 410 and 411 recommended; or consent of instructor. ½ unit.

461. Advanced Clinical Nutrition
Same as FSHN 420 and MED S 461. A series of five-week intensive courses on basic pathophysiological changes associated with major organ system failure, medical conditions with genetic or behavioral etiology, and appropriate nutritional assessment/support/treatment. Exposure to clinical nutrition through medical/nutrition rounds at medical centers. Covers topics such as cardiovascular disease, cancer, gastrointestinal diseases, diabetes, immunological diseases, nutritional care in obstetrics. *Prerequisite:* FSHN 320; 300 or 400 level physiology course. 1 hour or ¼ unit. May be repeated in same semester to a maximum of 2 hours or ¾ unit. Semester hours are for medical students only.

493. Individual Topics in Nutrition
For students majoring in nutritional sciences who wish to undertake individual studies of a nonthesis nature in problems or topics not covered in other courses; may be taken under

the direction of any member of the nutritional sciences faculty, with the exception of the student's own thesis adviser. *Prerequisite:* Consent of instructor. ¼ to 1 unit.

499. Thesis Research
0 to 4 units.

PAINTING

(See Art and Design, School of)

PERSIAN

(See Linguistics)

PHILOSOPHY

Chair of Department: Robert G. Wengert
Department Office: 105 Gregory Hall, 810 South Wright Street, Urbana
Phone: 333-2889
URL: www.phil.uiuc.edu

Note: Students are urged to consult the detailed descriptions of all philosophy courses to be offered in particular semesters. These descriptions may be obtained in the department office or from the departmental Web site.

Philosophy (PHIL)

101. Introduction to Philosophy
Consideration of some main problems of philosophy concerning, for example, knowledge, God, mind and body, and human freedom. 3 hours.

102. Logic and Reasoning
Practical study of logical reasoning; techniques for analyzing and criticizing arguments, with emphasis on assessing the logical coherence of what we read and write. 3 hours.

103. Scientific Reasoning
Practical study of scientific reasoning; methods for evaluating scientific evidence and for using scientific information in making decisions. 3 hours.

105. Introduction to Ethics
Some basic questions of ethics, discussed in the light of influential ethical theories and with reference to specific moral problems, such as: What makes an action morally right? Are moral standards absolute or relative? What is the relation between personal morality and social morality, and between social morality and law? 3 hours. Credit is not given for both PHIL 105 and 106.

106. Ethics and Social Policy
Examination of the moral aspects of social problems, and a survey of ethical principles formulated to validate social policy. 3 hours. Credit is not given for both PHIL 106 and 105.

107. Introduction to Political Philosophy
Examination of the philosophical bases of democracy and some alternative political forms. 3 hours.

108. The Sacred Mind: Religion and Society in Western Thought from Antiquity to the Enlightenment
Same as ANTH, SOC and RELST 108. See RELST 108.

109. The Secular Mind: Religion and Society in Western Thought from the Enlightenment to the Present
Same as ANTH, SOC and RELST 109. See RELST 109.

110. World Religions
Same as RELST 110. See RELST 110.

191. Freshman Honors Tutorial
Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

198. Freshman Seminar
Investigation of selected fundamental topics of philosophical inquiry. See *Timetable* for current topics. *Prerequisite:* Freshman James Scholar. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

201. Philosophy in Literature
Consideration of the philosophical themes implicit in a variety of important literary works, both classical and modern; may include such authors as Sophocles, Shakespeare, Goethe, Dostoevsky, and Sartre. 3 hours.

202. Symbolic Logic
Introduction to the techniques of formal logic, dealing primarily with truth-functional logic and quantification theory. 3 hours.

203. Ancient Philosophy
Introduction to ancient philosophy, concentrating on Plato and Aristotle, dealing with such topics as metaphysics, ethics, and the theory of knowledge. 4 hours.

206. Early Modern Philosophy
The history of philosophy from Descartes to Kant. 4 hours.

207. Early Modern Philosophy, I

Bacon, Hobbes, Locke, Berkeley, and Hume. PHIL 207 and 208 taken concurrently in the summer session are the equivalent of PHIL 206. 2 hours. Offered in the summer session only.

208. Early Modern Philosophy, II

Descartes, Spinoza, Leibniz, and Kant. PHIL 207 and 208 taken concurrently in the summer session are the equivalent of PHIL 206. 2 hours. Offered in the summer session only.

210. Ethics

Problems in ethical theory; the nature of right and wrong, justice, conscience, moral feelings, etc. 3 hours.

214. Moral Problems in Medicine and Biology

Philosophical study of selected moral and social problems concerning medicine and biology, such as euthanasia, abortion, allocation of scarce medical resources, health care and rights, and genetic engineering. 3 hours.

216. Engineering Ethics

Same as ECE 216. See ECE 216.

225. Recent European Philosophy

Introduction to the major recent philosophical movements in Europe, such as phenomenology, existentialism, philosophical anthropology, and neo-Marxism. 3 hours.

230. Philosophy of Religion: Introduction

Same as RELST 230. Introduction to philosophical analysis of religious thought and experience. 3 hours.

250. Conceptions of Human Nature

Comparative examination of important historical and contemporary conceptions of human nature. 3 hours.

270. Philosophy of Science

Investigation of the nature of scientific knowledge by examining archetypal examples from physical science (e.g., Ptolemaic and Copernican astronomy); nature of scientific truth, validation of theories, nature of scientific theories, evolution of theories, experimental procedure, role of presuppositions, scientific revolutions, etc. 3 hours.

280. Current Controversies

Philosophical examination of positions taken on some issue of current concern, e.g., human sexuality, death and dying, feminism, race, intelligence, war, and sociobiology. See *Timetable* for current topics. 3 hours. May be repeated with consent of department chair.

290. Individual Study

Readings in selected philosophical topics. Course may be taken by honors students in partial fulfillment of department honors requirements. *Prerequisite:* Open to juniors and seniors with a GPA of 3.0 only by prior arrangement with a regular member of the staff and with consent of the department chair. 2 to 4 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

292. Thesis

Special training in philosophical investigation. Course may be taken by honors students in partial fulfillment of department honors requirements. *Prerequisite:* Open to seniors with a GPA of 3.0 only by prior arrangement with a regular member of the staff and with consent of the department chair. 2 to 4 hours. May be repeated to a maximum of 4 hours. (Counts for advanced hours in L.A.S.)

298. Advanced Undergraduate Seminar

Seminar on selected philosophical topics; intended primarily for advanced undergraduate philosophy majors. *Prerequisite:* A GPA of 3.0 and consent of instructor. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L.A.S.)

301. Philosophy and Film

Same as CINE 301. Study of procedures for interpreting narrative films and evaluating specific interpretations, as well as an examination of philosophical issues raised in selected films. *Prerequisite:* One course in philosophy or in cinema studies. 4 hours or 1 unit.

304. Medieval Philosophy

History of philosophy from St. Augustine to William of Ockham. *Prerequisite:* PHIL 101 or 203. 3 hours, or $\frac{3}{4}$ or 1 unit.

310. Classical Ancient Philosophers

Intensive study of one ancient philosopher or the intensive study of a major philosophical problem through the consideration of a number of ancient philosophers; chief emphasis on Plato and/or Aristotle. *Prerequisite:* One course in philosophy, preferably PHIL 203. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated for credit with the consent of the department chair. Students may register for this course more than once in the same term.

311. Nineteenth-Century Philosophy

Examination of the thought of such major figures as Hegel, Marx, and Nietzsche. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

312. Classical Modern Philosophers

Intensive study of one, or in special cases, two major philosophers of the period 1600–1900, e.g., Descartes, Hume, Kant, or Hegel. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated. Students may register for this course more than once in the same term.

313. American Philosophy

Examination of American philosophers from colonial to recent times, for example, Edwards, Peirce, James, Dewey. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

314. Major Recent Philosophers

Intensive study of one or two important philosophers of the present century, e.g., Wittgenstein, Dewey, Heidegger, or Quine. Topics vary; see *Timetable*. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated for credit with consent of the department chair. Students may register for this course more than once in the same term.

316. Anglo-American Philosophy Since 1900

Introduction to the major philosophical developments in England and America in the present century, focusing on such writers as G. E. Moore, Bertrand Russell, A. J. Ayer, Ludwig Wittgenstein, and W. V. Quine. *Prerequisite:* One course in philosophy. 3 hours or 1 unit.

317. Scientific Thought, I

Same as HIST 339. Historical and critical survey of the development of science and its philosophical interpretation to the death of Newton. 3 hours or 1 unit.

318. Scientific Thought, II

Same as HIST 340. Historical and critical survey of the development of science and its philosophical interpretation from the death of Newton to the early twentieth century. *Prerequisite:* PHIL 317. 3 hours or 1 unit.

319. Space, Time, and Matter

Same as PHYS 319. See PHYS 319.

321. Moral Philosophy

Systematic study of selected classics in moral philosophy by such philosophers as Aristotle, Hume, and Kant. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

322. Recent Developments in Ethics

Intensive treatment of issues in contemporary ethical theory. *Prerequisite:* One course in ethics. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated for credit once with consent of the department chair.

323. Philosophy of Art

Examination of philosophical interpretations of art and aesthetic experience by influential classical and recent writers. 3 hours, or $\frac{3}{4}$ or 1 unit.

324. Philosophy of Religion

Same as RELST 362. Considers central issues in the philosophy of religion, e.g., the justification of religious belief, the nature of God, religious experience, etc. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

325. Philosophy of Mind

Philosophical problems arising in connection with mental phenomena; the relation of mind and body; free will and determinism; our knowledge of other minds; and the self and personal identity. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

326. Metaphysics

Investigation of various metaphysical issues concerning, for example, existence, substance, particulars and universals, and space and time. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

327. Philosophical Anthropology

Philosophical approaches and contributions to the understanding of human nature. *Prerequisite:* One course in philosophy (preferably PHIL 101, 203, 206, 225, or 250). 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated to a maximum of 6 hours or 2 units. Course may be repeated for credit only with the consent of the chair of the department.

329. Value Theory

Study of the nature and status of values, and of variable topics in value theory, e.g., different types of values, and problems of truth, justifiability, objectivity and relativism with respect to them. *Prerequisite:* Junior standing. 3 hours, or $\frac{3}{4}$ or 1 unit. May be repeated in subsequent semesters as topics vary to a maximum of 6 hours or 2 units.

330. Theory of Knowledge

Investigation of issues concerning, for example, the nature and possibility of knowledge; its forms and limits; its relation to belief, truth, and justification; and the nature of truth. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

335. Social Philosophy

Selected topics from the nature of social organization, nature and convention, utility, justice, equality, liberty, rights, and duties. *Prerequisite:* PHIL 105, 106, or 321, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

336. Philosophy of Law and of the State

Examination of issues in the philosophy of law, such as the nature of law, law and morality, justice, liberty and authority, punishment, and legal responsibility. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

337. Semantics

Study of semantical concepts such as meaning, truth, reference, and denotation; the relation of meaning, verification, and truth; and semantical paradoxes. *Prerequisite:* A course in logic. 3 hours, or $\frac{3}{4}$ or 1 unit.

338. Philosophy of Language

Same as LING 338. Historical or comparative study of the philosophy of language. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

339. Philosophy of Mathematics

Same as MATH 339. Introduction to some of the main philosophical problems and contemporary viewpoints concerning mathematical concepts, mathematical methods, and the nature of mathematical truth. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

341. Existential Philosophy

Study of a selection of the major writings of the more important existential philosophers, e.g., Heidegger, Jaspers, and Sartre. *Prerequisite:* One course in philosophy (preferably PHIL 225 or 311), or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

343. Phenomenology

Study of the development of phenomenology from Husserl to the present. *Prerequisite:* One course in philosophy. 3 hours, or $\frac{3}{4}$ or 1 unit.

344. Topics in Recent European Philosophy

Examines the continental treatments of selected issues, such as interpersonal relationships, human nature, perception or interpretation; see *Timetable* for current topics. *Prerequisite:* PHIL 225, 311, 341, 343, or 347; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

347. Post-Structuralist French Philosophy

Intensive study of a selection of the major writings of recent French philosophers, such as Foucault and Derrida. *Prerequisite:* PHIL 225, 341, or 343, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

353. Formal Logic and Philosophy

Techniques and results of symbolic logic, with special attention to topics of philosophical importance. *Prerequisite:* PHIL 202, graduate standing, or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

354. Advanced Symbolic Logic

Completeness, compactness, and Lowenheim-Skolem theorems for first-order logic; incompleteness and undecidability of formal systems; and additional material on proof theory, model theory, or axiomatic set theory as time permits. *Prerequisite:* PHIL 202 or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit.

371. Philosophy of Science: Contemporary Issues

Examines important developments and controversies in recent philosophy of science. *Prerequisite:* PHIL 270 or consent of instructor. 3 hours or 1 unit.

373. Philosophy of Biology

Same as BIOL 373. Philosophical issues in biology covering basic concepts such as fitness, evolution, adaptation, natural selection, and issues such as the unit of selection, genetic reductionism, cultural evolution. *Prerequisite:* Two courses in philosophy or two course in biology; or consent of instructor. 3 hours, or $\frac{3}{4}$ or 1 unit. Graduate students taking the course for 1 unit rather than for $\frac{3}{4}$ unit will be expected to do additional reading and write more substantial papers.

375. The Philosophy of Social Science

Same as ANTH 329 and SOC 325. Survey of philosophical problems encountered in the disciplines concerned with the individual and society, with particular emphasis on the extent to which questions and subject matter in these fields are amenable to scientific treatment. 3 hours or 1 unit.

377. Philosophy of Psychology

Same as PSYCH 377. Philosophical examination of the aims, methods, and structure of psychology, with special attention to such issues as the nature of explanations of behavior, the adequacy of behaviorism as a philosophy of psychology, and the place of the mind in psychological investigation. *Prerequisite:* Two courses in psychology, or consent of instructor. 3 hours or 1 unit.

401. Seminar in the History of Philosophy

Study of selected major philosophers, movements, problems, or topics in the history of philosophy; see *Timetable* for current topics. 1 unit. May be repeated. Students may register for this course more than once in the same term.

411. Seminar in Ethical Theory

Intensive study of problems in ethical theory. 1 unit. May be repeated as topics vary. Students may register for this course more than once in the same term.

412. Seminar in Social Philosophy

Seminar designed to study special problems in social philosophy. See *Timetable* for current topics. 1 unit. May be repeated.

413. Seminar in the Philosophy of Logic

Selected topics in contemporary logical theory. *Prerequisite:* A course in logic or consent of instructor. 1 unit. May be repeated.

417. Seminar in the Philosophy of Science

Various problems arising from specific studies in philosophy pertaining to science and vice versa. To be offered with varying topics. 1 unit. May be repeated.

420. Seminar in Semantics

Same as COMM 420. Intensive study of important contemporary contributions in the fields of semantics, analytic philosophy, and the philosophy of language. *Prerequisite:* Graduate standing in philosophy or equivalent. 1 unit. May be repeated.

421. Seminar in Contemporary Problems

Intensive study of selected problems or topics in contemporary philosophy. 1 unit. May be repeated. Students may register for this course more than once in the same term.

423. Seminar in the Theory of Knowledge

Selected topics and writings of major importance in the contemporary philosophy of knowledge. 1 unit. May be repeated.

425. Seminar in the Philosophy of Mind

Selected topics from major writings in the philosophy of mind. 1 unit. May be repeated.

470. Proseminar in Cognitive Science

Same as ANTH and LING 470, CS 449, EDPSY and PSYCH 471. See ANTH 470.

483. Individual Topics

Individual study and oral and written reports on topics not covered in other courses. Topics and plan of study must be approved by the candidate's adviser and by the staff member who directs the work. $\frac{1}{2}$ or 1 unit (summer session, $\frac{1}{2}$ to 2 units).

490. Directed Research

Restricted to students satisfying requirements for the master's degree by writing a substantial essay. 0 to 3 units. Normally taken for 2 units credit but may be taken for 3 units credit with consent of department chair.

499. Thesis Research

0 to 4 units.

PHOTOGRAPHY

(See Art and Design, School of)

PHYSICS

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 Phone: 333-3761
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Physics (PHYCS)

100. Thinking About Physics

Course is designed for students who want to prepare for PHYCS 111 by improving their conceptual and problem solving skills. Students will learn to analyze physical situations, describe them mathematically, and understand the meaning of the solutions. Examples will be drawn from material that will be covered in PHYCS 111. *Prerequisite:* Credit or concurrent registration in MATH 120, or consent of the instructor. 1 hour. Students may register for PHYCS 100 and 111 concurrently.

101. General Physics (Mechanics, Heat, and Sound)

Noncalculus-based course for students in the life sciences, preprofessional health programs, agriculture, and veterinary medicine. *Prerequisite:* Trigonometry. 5 hours.

102. General Physics (Light, Electricity, Magnetism, and Modern Physics)

Noncalculus-based course for students in life sciences, preprofessional health programs, agriculture, and veterinary medicine. *Prerequisite:* PHYCS 101. 5 hours.

111. General Physics (Mechanics)

Lectures with demonstrations, recitations, and laboratory. For students in engineering, mathematics, physics, and chemistry. Topics include Newton's Laws, work and energy, oscillations, transverse waves, systems of particles, and rotations. *Prerequisite:* MATH 120, credit or concurrent registration in MATH 130. 4 hours. Students may not receive credit for both PHYCS 111 and PHYCS 101.

112. General Physics (Electricity and Magnetism)

Lectures with demonstrations, recitations, and laboratory. For students in engineering, mathematics, physics, and chemistry. Topics include Coulomb's Law, electric fields, Gauss' Law, electric potential, capacitance, circuits, magnetic forces and fields, Ampere's law, induction, electromagnetic waves, polarization, and geometrical optics. *Prerequisite:* PHYCS 111, credit or concurrent registration in MATH 242. 4 hours. Students may not receive credit for both PHYCS 112 and PHYCS 102.

113. General Physics (Fluids and Thermal Physics)

Lectures with demonstrations, recitations, and laboratory. For students in engineering, mathematics, physics, and chemistry. Topics include fluid motion, propagation of heat and

sound, temperature and kinetic theory of gases, heat capacity and latent heat, first law of thermodynamics, heat engines and the second law, and introduction to statistical mechanics. *Prerequisite:* PHYCS 111, credit or concurrent registration in MATH 242. 2 hours. Students may not receive credit for both PHYCS 113 and PHYCS 101.

114. General Physics (Waves and Quantum Physics)

Lectures with demonstrations, recitations, and laboratory. For students in engineering, mathematics, physics, and chemistry. Topics include interference and diffraction, photons and matter waves, the Bohr atom, uncertainty principle, and wave mechanics. *Prerequisite:* PHYCS 111, 112, credit or concurrent registration in MATH 242. 2 hours. Students may not receive credit for both PHYCS 114 and PHYCS 102.

140. Practical Physics: How Things Work—A Course for Nonscientists

Nonmathematical lecture-demonstration course for nonscience students, underscoring the generality and ubiquity of basic physical laws in understanding commonplace phenomena: musical instruments, photography, electric and electronic circuits, television, motors, engines, etc. 3 hours. No credit for students in the College of Engineering.

141. Special Problems

Special problems in physics: discussions and independent study. Supplement to PHYCS 140. *Prerequisite:* Credit or concurrent registration in PHYCS 140. 1 hour.

150. Physics and the Modern World: A Course for Nonscientists

Nonmathematical lecture course attempting to bridge the two-culture gap; takes examples from modern physics: relativity, elementary particles, quantum theory, statistics, etc., and covers basic philosophical concepts in physics which pervade all human disciplines: model-making, dynamics, ensemble behavior, and symmetry. 3 hours.

151. Special Problems

Special problems in physics: discussions and independent study. Supplement to PHYCS 150. *Prerequisite:* Credit or concurrent registration in PHYCS 150. 1 hour.

180. Nuclear Weapons, Nuclear War, and Arms Control

Beginner's course on the physics of nuclear weapons, nuclear weapon effects, delivery systems, and defenses against nuclear attack; nontechnical, but about technology. Designed to assist students in making informed judgments about nuclear armaments and arms control; includes presentation of current issues. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

210. Introductory Relativity

Examines the consequences of Einstein's postulates for space and time; relativistic momentum and energy: $E=mc^2$; the equivalence principle, gravity, and the spacetime viewpoint of general relativity; the relativistic unity of elec-

tric and magnetic fields. *Prerequisite:* Concurrent registration in PHYCS 102 or 107. 2 hours. Credit given for both PHYCS 210 and 225. (Offered in fall semester only.)

225. Intermediate Mechanics and Relativity, I

Examines kinematics and dynamics. Vector analysis will be developed as needed. Topics include special relativity, Newtonian kinematics and dynamics in three dimensions, behavior of systems of particles, oscillations, transient response of oscillators, nonlinear oscillators, motion in rotating frames of reference, and rigid body dynamics. *Prerequisite:* Credit or concurrent registration in PHYCS 112 and in MATH 285; or consent of instructor. 3 hours. Credit not given for both PHYCS 225 and 210.

301. Classical Physical Lab

Experiments and techniques in Classical Mechanics and Electromagnetism. Dynamics of electrical and mechanical oscillators in the linear domain. Fourier analysis of system response. Measurements of electrostatic fields, transmission lines, waves, and radiation. Investigation of electromagnetic phenomena in dielectrics, conductors, magnetic materials. Instruction in data analysis and report writing. *Prerequisite:* PHYCS 225; or consent of instructor. 3 hours or $\frac{3}{4}$ unit. No graduate credit for students enrolled in the physics graduate program.

302. Principles of Atmospheric Dynamics

Same as ATMOS 302. See ATMOS 302.

303. Modern Experimental Physics

Techniques and experiments in the physics of atoms, atomic nuclei, molecules, the solid state, and other areas of modern physical research. *Prerequisite:* PHYCS 301; concurrent registration in PHYCS 386, or consent of instructor. 3 to 5 hours, or $\frac{1}{2}$ to 1 unit. Students taking the course for the first time must register for 5 hours or 1 unit. Those repeating the course may do so for variable credit of 3 to 5 hours, or $\frac{1}{2}$ to 1 unit.

319. Space, Time, and Matter

Same as PHIL 319. Philosophical examination of some fundamental concepts and theories of the physical world, such as time, matter, causation, space, and geometry; interpretation of quantum theory. Graduate students write an additional paper. *Prerequisite:* Junior standing, one physical science course, and one of the following: PHYCS 114 or PHIL 101, 270, or 317; or consent of instructor. 3 hours or 1 unit.

326. Intermediate Mechanics and Relativity, II

Continuation of PHYCS 225. Topics include Lagrangian techniques and the calculus of variations, central force motion, scattering, coupled oscillations, the wave equation in one dimension, generalized coordinates and the Hamiltonian formulation, relativistic dynamics, Euler angles and tops, nonlinear and fluid dynamics. *Prerequisite:* PHYCS 225; credit or concurrent registration in MATH 280; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

335. Electromagnetic Fields and Sources, I
Concerns static electric and magnetic fields, their interactions with electric charge and current, and their transformation properties; the effect of special relativity is incorporated. Macroscopic fields in material media are described. *Prerequisite:* PHYCS 225, MATH 285, and credit or concurrent registration in MATH 280, or consent of instructor. 3 hours, or $\frac{3}{4}$ unit.

336. Electromagnetic Fields and Sources, II
Concentrates on time dependent fields. Electromagnetic induction, Maxwell's equations, electromagnetic wave propagation in various media and structures, and electromagnetic radiation from charge and current distributions are treated. The relativistic covariance of Maxwell's equations is discussed. *Prerequisite:* PHYCS 326 and 335; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

343. Electronic Circuits, I
Same as CHEM 323. The physics of semiconductor devices; theory and application of discrete and integrated devices in linear circuits; use of operational amplifiers and feedback; regulation, oscillators, and modulation; emphasizes practical experience. Lectures, problems, and laboratory. *Prerequisite:* PHYCS 301 and 335, or consent of instructor. 5 hours or 1 unit. (Offered spring semester only.)

344. Electronic Circuits, II
Continuation of PHYCS 343 with particular emphasis on nonlinear devices, switching circuits, digital logic, analog to digital and digital to analog conversion, and individual projects. Lectures, problems, and laboratory. *Prerequisite:* PHYCS 343 or consent of instructor. 5 hours or 1 unit. (Offered fall semester only.)

346. Modern Physics for Nuclear Engineers
Same as NUC E 346. See NUC E 346.

361. Thermodynamics and Statistical Mechanics
Course in statistical and thermal physics designed primarily for advanced undergraduates; topics include equilibrium thermodynamics, statistical mechanics, and kinetic theory of gases. A unified treatment is used in that the principles of heat and thermodynamics are discussed along with statistical postulates and the microscopic approach of introductory quantum mechanics. *Prerequisite:* Two 300-level courses in physics or consent of instructor. 4 hours or 1 unit. Credit is not given for both PHYCS 361 and any of the following: ME 301, CHEM 342 and 344, and MATSE 400.

363. Atomic-Scale Simulations
Same as MATSE 385, and CSE 373. See MATSE 385.

365. Plasma and Fusion Science
Same as NUC E and ECE 321. See NUC E 321.

371. Light
Wave kinematics; geometrical optics: basic concepts, ray-tracing and matrix formalism, Gaussian imaging by thick lenses, stops, and apertures, and intensity relations; interference; interference spectroscopy and coherence; diffraction: Fresnel-Kirchhoff formulation,

Fraunhofer case, Fresnel case, and holography; polarized light. Lectures, laboratory, and problems. *Prerequisite:* PHYCS 101 and 102, or PHYCS 111, 112, and 114; MATH 285; or consent of instructor. 4 hours, or $\frac{3}{4}$ or 1 unit ($\frac{3}{4}$ unit without lab).

382. Subatomic Physics
Lecture and problem course surveying subatomic physics; includes the nature and properties of nuclei and elementary particles, symmetries, interactions, nuclear models, tools and techniques of experimental subatomic physics, and applications to power generation, astrophysics, chemistry, medicine, and biology. *Prerequisite:* PHYCS 383 or 386, or consent of instructor. 4 hours or 1 unit. (Offered spring semester only.)

383. Atomic Physics and Quantum Theory
Introduction to the basic concepts of quantum theory which underlie modern theories of the properties of materials; topics covered include elements of atomic and nuclear theory; kinetic theory and statistical mechanics; quantum theory and simple applications; atomic spectra and atomic structure; molecular structure and chemical binding. Lectures and problems. *Prerequisite:* General physics; general chemistry; MATH 285 or equivalent. 3 hours or $\frac{3}{4}$ unit.

386. Atomic Physics and Quantum Mechanics, I
Studies atomic phenomena integrated with an introduction to quantum theory; discussion of topics includes evidence for the atomic nature of matter and the properties of the Schrodinger equation, single particle solutions in one dimension, the hydrogen atom, perturbation theory, external fields, and atomic spectroscopy of outer electrons. *Prerequisite:* General physics; MATH 285, credit or concurrent registration in MATH 315, or consent of instructor. 4 hours or 1 unit.

387. Atomic Physics and Quantum Mechanics, II
Continuation of PHYCS 386. Topics treated include identical particles, spectral hyperfine structure, magnetic properties of matter, atomic spectroscopy of inner electrons, high-energy photon effects, molecular binding and spectra, emission and absorption of light, and symmetry principles. *Prerequisite:* PHYCS 386. 4 hours or 1 unit.

389. Introduction to Solid State Physics
Bonding and structure of crystals; energy bands in insulators, semiconductors, and metals; electrical conductivity; optical properties; lattice vibrations; elasticity; point defects; dislocations. *Prerequisite:* Junior standing in science or engineering, or equivalent. 4 hours or 1 unit. (Offered fall semester only.) Students may not receive credit for both PHYCS 389 and MATSE 204.

397. Individual Study
Individual study at an advanced level in a subject not covered by course offerings. *Prerequisite:* Upperclassman; consent of adviser and staff member who supervises the work. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

398. Seminar on Special Topics in Modern Physics
Lecture course on topics of current interest in physics. For advanced undergraduates or graduates. Subjects and prerequisites to be announced in the *Timetable*. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit.

404. Stellar Structure and Evolution
Same as ASTR 404. See ASTR 404.

405. Diffuse Matter Astrophysics
Same as ASTR 405. See ASTR 405.

406. The Physics of Compact Objects
Same as ASTR 406. A rigorous survey of the physical properties of black holes, white dwarfs, and neutron stars. The formation of compact objects. Equilibrium configurations, equations of state, stability criteria, and mass limits: the influence of rotation and magnetic fields. Pulsar phenomena. Black hole spacetimes. Hawking radiation. Mass flow in binary systems; spherical and disk accretion; high-temperature radiation processes; pulsar spin-up. Compact x-ray sources and x-ray bursts. Supermassive black holes in star clusters and dense galactic nuclei. Gravitational and neutrino radiation from supernova collapse and binary coalescence. *Prerequisite:* PHYCS 336 or equivalent, or consent of instructor. 1 unit. The course does not assume any previous knowledge of astronomy or general relativity. (Offered in alternate years.)

411. Special Functions and Boundary Value Problems in Physics
Use of special functions in solving homogeneous partial differential equations of physics; emphasis on applications to topics such as electrostatics, wave guides and resonant cavities, vibrations of membranes, heat flow, and potential flow in fluids. *Prerequisite:* MATH 280 and 285, or equivalent. This course may be taken concurrently with PHYCS 413 or 414. $\frac{1}{2}$ unit.

412. Additional Techniques of Mathematical Physics
Solution of inhomogeneous differential equations with particular emphasis on problems in electromagnetism; additional topics such as perturbation theory, variational methods, and integral equations; emphasis on application of the techniques to nonquantum physics problems. *Prerequisite:* PHYCS 411 or equivalent. This course may be taken concurrently with PHYCS 413 or PHYCS 414. $\frac{1}{2}$ unit.

413. Uses of Complex Variables in Physics
Review of complex variable theory, with emphasis on calculations useful to physicists; integration, conformal mapping, Laplace and Fourier transforms, and additional topics of use in theoretical physics. *Prerequisite:* Undergraduate mathematics at the level of MATH 280 and 285; some previous exposure to complex variables helpful, but not required. $\frac{1}{2}$ unit.

414. Basics of Advanced Mechanics
Fundamentals of classical Lagrangian and Hamiltonian mechanics, with emphasis on the relation between dynamical symmetries and constants of the motion; use of conservation laws to derive basic equations of fluid

dynamics; discussion of some applications. *Prerequisite:* Mechanics course at the level of PHYCS 326 or consent of instructor. $\frac{1}{2}$ unit.

415. Introduction to Continuum Mechanics
Basic information on stress, strain, and waves in an elastic solid, the Euler and Navier Stokes equations, potential flow, vortex theory, viscous flows, gas dynamics, characteristics, and shock waves. *Prerequisite:* Concurrent registration in PHYCS 411 and 412, or equivalent. $\frac{1}{2}$ unit.

417. Lie Groups and Their Physical Applications

Introduces Lie groups with emphasis on concepts and applications to physics problems; includes finite groups, three dimensional rotation groups, classification and representation of Lie groups, integrations, and applications to particle, nuclear, and condensed matter physics. *Prerequisite:* PHYCS 480 or consent of instructor. $\frac{1}{2}$ unit.

420. Nonlinear Dynamics

Broad introduction to nonlinear dynamics of physical systems with varying degrees of complexity; surveys a variety of concepts associated with bifurcation phenomena, mappings, nonlinear oscillations, chaotic behavior, strange attractors, solitons, and topics of current interest. *Prerequisite:* MATH 280 or 285 or equivalent; PHYCS 326 or equivalent; or consent of instructor. 1 unit.

421. Advanced Nonlinear Dynamics

Analysis of the dynamics of spatially extended and other complex physical systems using analytical, experimental, computational, topological, and symbolic methods; examples may involve mechanical, electrical, optical, solid state, fluid, chemical, biological, and network systems. *Prerequisite:* PHYCS 420. 1 unit.

430. Surface Physics

Same as MATSE 482. See MATSE 482.

435. Theory of Semiconductors and Semiconductor Devices

Same as ECE 435. See ECE 435.

442. Classical Electromagnetic Radiation

Review of Maxwell's equations followed by a relativistic formulation of the electromagnetic field and the motion of charged particles; plane and guided waves; retarded potentials; radiation from simple antennas; radiation from accelerated charged particles; synchrotron radiation, bremsstrahlung, scattering, and further topics. *Prerequisite:* PHYCS 411 and 412, or equivalent; electromagnetism and special relativity at the level of PHYCS 336. 1 unit.

450. Biomolecular Physics

Same as BIOCH and BIOPH 450. Physical concepts governing the structure and function of biological macromolecules; general properties, spatial structure, energy levels, dynamics and functions, and relation to other complex physical systems such as glasses; recent research in biomolecular physics; physical techniques and concepts from theoretical physics emphasized. Designed for students

without appreciable background in biology and chemistry. *Prerequisite:* CHEM 102 or equivalent, PHYCS 383 or 387 or equivalent, or consent of instructor. 1 unit.

455. Reactor Theory, I

Same as NUC E 455. See NUC E 455.

456. Reactor Theory, II

Same as NUC E 456. See NUC E 456.

459. Asymptotics and Singular Perturbations in Engineering and Physics

Same as MATH, NUC E and T A M 459. See T A M 459.

462. Statistical Mechanics and Kinetic Theory

Single-particle distribution functions; classical and quantum mechanical systems, Boltzmann equation, virial theorem, and equations of state for gases; formal theory: ensembles, identical particles, thermodynamics of simple systems, and distribution functions; nonequilibrium problems; conservation laws and hydrodynamic equations, sound waves, and transport coefficients; plasmas, normal Fermi fluid, superfluids, and systems with internal degrees of freedom. *Prerequisite:* PHYCS 361 and elementary quantum mechanics, or consent of instructor. 1 unit.

463. Liquid Helium and Superconductivity

Emphasizes fundamental physical phenomena rather than detailed microscopic theory; normal Fermi liquids and normal liquid ^3He : equilibrium properties, kinetic equation, collective modes, and finite temperature effects; superfluid ^4He : equilibrium properties, two fluid model, Bogoliubov's microscopic model, condensates, and vortex lines; superconductivity: electrodynamic properties, Landau-Ginzburg theory, BCS theory, tunneling, Josephson effect, and superfluid ^3He . *Prerequisite:* PHYCS 462 and 481, or consent of instructor. 1 unit.

464. Phase Transitions

Phenomenology of phase transitions, scaling, critical behavior, and multicriticality; Landau theory of phase transitions; renormalization group methods, including lattice models and epsilon-expansion; numerical methods; critical dynamics; and selected additional topics. *Prerequisite:* PHYCS 462 or consent of instructor. 1 unit.

470. Introduction to Nuclear and Particle Physics

Nuclear systematics, nucleon-nucleon interaction, shell model, and single particle and collective excitations; hadron spectroscopy, hadronic quantum numbers, quark-parton model, and hadron dynamics; weak interactions. *Prerequisite:* PHYCS 480 and concurrent registration in PHYCS 481. 1 unit.

471. Nuclear Reactions and Structure

Experimental information on nuclear forces; the basis of the independent-particle model; the nuclear shell model; the nuclear ground state; nuclear giant resonances; deformed nuclei; direct nuclear reactions; large-amplitude nuclear motion; statistical description of the nucleus. *Prerequisite:* PHYCS 470. 1 unit.

472. Special Topics in Nuclear Physics

Current research in nuclear physics; topics include one or more of: photon physics, electron-nucleus scattering and nucleon structure, Few-nucleon systems and nuclear and neutron matter, nuclear astrophysics, Meson physics, Relativistic nuclear physics, heavy-ion physics, Quarks in the nucleon and in nuclei. *Prerequisite:* PHYCS 471 or consent of instructor. 1 unit. May be repeated for credit.

475. Particle Physics, I

Basic calculations in elementary particle theory. Quantum electrodynamics, quantum chromodynamics, and the Glashow-Weinberg-Salam theory of weak and electromagnetic interactions as applied to the phenomenology of particle decays and high energy reactions. *Prerequisite:* PHYCS 470; credit or concurrent registration in PHYCS 483 strongly recommended. In exceptional circumstances, PHYCS 470 may be taken concurrently. 1 unit.

476. Particle Physics, II

Continuation of PHYCS 475. Current topics in particle theory; topics change from year to year. Typically treats three or four different subjects in depth. *Prerequisite:* PHYCS 475, or consent of instructor. 1 unit.

480. Quantum Mechanics, I

Second course in quantum mechanics for students with a good background in wave mechanics and atomic and molecular structure. Operators, state vectors, and the formal structure of quantum theory; operator treatments of simple systems; angular momentum and vector addition coefficients; stationary state perturbation theory; introduction to scattering theory for particles without spin, partial wave analysis, and Born approximation; examples taken from atomic, nuclear, and elementary particle physics. *Prerequisite:* Senior-level atomic physics and quantum mechanics, or consent of instructor. 1 unit.

481. Quantum Mechanics, II

Spin and identical particles, simple many-particle systems and elements of second-quantization theory; time-dependent processes, radiative transitions, and quantization of the electromagnetic field; scattering of particles with spin; polarization; introduction to the Klein-Gordon and Dirac equations, and properties of simple relativistic systems. *Prerequisite:* PHYCS 480 or consent of instructor. 1 unit.

483. General Field Theory

Covers standard techniques of field theory as used by experimenters and theorists; relativistic quantum mechanics of a single particle; Lagrangian field theories, perturbation theory, and calculation of lowest-order processes; introduction to Feynman diagrams and higher order processes; examples taken from quantum electrodynamics, solid-state and elementary particle physics, and many-body theory. *Prerequisite:* PHYCS 481 or consent of instructor. 1 unit.

485. Advanced Field Theory

Quantization and Feynman path integral; gauge theories and renormalization; renormalization group with applications to particle physics and critical phenomena; approximation methods

and recent developments. *Prerequisite:* PHYCS 483 or consent of instructor. 1 unit.

489. Solid State Physics, I

Crystalline perfection, free electron gas, screening, plasma oscillations, and dielectric response; Bloch electrons, Brillouin zones, and band structure; semiconductors, intrinsic and extrinsic, with applications; phonons, elasticity, and anharmonicity; ferromagnetism and second-order phase transitions; superconductivity. *Prerequisite:* PHYCS 361 or consent of instructor; and PHYCS 480. 1 unit.

490. Solid State Physics, II

Hartree-Fock theory and electron-electron interactions; electron-phonon interactions; electron dynamics and transport; BCS theory of superconductivity; elastic properties; thermal properties due to anharmonicity; defects in solids. *Prerequisite:* PHYCS 481 and 489. 1 unit.

497. Individual Study

Individual study in a subject not covered in course offerings may be arranged for credit by registration under this number. $\frac{1}{2}$ to 4 units for full semester; $\frac{1}{4}$ to 2 units for half-semester.

498. Seminar on Special Topics in Modern Physics

Lecture course in topics of current interest. Several subjects are announced in each *Timetable*. Among them are semiconductor physics, magnetic resonance, surface physics, lattice dynamics, band theory of solids, crystal imperfections, nuclear structure, field theory, elementary particle physics, advanced statistical mechanics, plasma theory, astrophysics, atmospheric physics, group theory and applications. *Prerequisite:* Determined for each offering. See *Timetable*. $\frac{1}{4}$ to 1 unit.

499. Thesis Research

0 to 4 units.

PLANT BIOLOGY

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Plant Biology (PLBIO)

100. Plant Biology

Basic principles of growth and form, physiology, genetics, evolution, and ecology in plant biology. Lecture, laboratory, and discussion. 4 hours. Students may not receive credit for both PLBIO 100 and 102.

102. Plants, Environment, and Man

Designed primarily to give the nonscience student an introduction to plants, their role in the environment, and their relation to man. Discussions and demonstrations emphasize practical aspects of plant biology and science

as they relate to man. Lecture and discussion. 3 hours. Students may not receive credit for both PLBIO 102 and 100.

234. Form and Function in Flowering Plants

Lecture course on the physiological and morphological attributes that underlie the biosynthesis, growth, and reproduction of flowering plants in relation to the environment. *Prerequisite:* PLBIO 100 or 102, or a year of biology; CHEM 102 and 106. 3 hours. (Counts for advanced hours in L.A.S.)

260. Systematics of Flowering Plants

Introduces the principles and methods of the identification, naming, classification, systematics, and evolution of flowering plants; includes a survey of selected flowering plant families with information on their interrelationships. Field trips are given as part of the laboratories. *Prerequisite:* PLBIO 100; or BIOL 100, 101, or 121; or consent of the instructor. 4 hours. (Counts for advanced hours in L.A.S.)

263. Plants and Their Uses

Same as ANTH 264. Consideration of plants which are useful or harmful: their origins and history, botanical relationships, chemical constituents which make them economically important, and their roles in prehistoric and modern cultures and civilizations. *Prerequisite:* PLBIO 100 or 102, or BIOL 121. 3 hours.

266. Environmental Botany

Same as NRES 266. Discussion, lab and field course dealing with botanical natural history and related environmental issues. Major topics include: diversity of biomes and habitats; taxonomy and identification of major plant groups; impact of humans on habitats and plants; and efforts to deal with that impact. The Illinois flora and habitats are emphasized and integrated into a global perspective of change, including those driven by geological, ecological, climatic, and anthropocentric forces. *Prerequisite:* PLBIO 100 or 102, BIOL 121, or consent of instructor. 3 hours.

290. Individual Topics

For juniors and seniors who wish to study individual problems and topics not assigned in other courses. *Prerequisite:* 10 hours of advanced work in plant biology or another biological science; junior or senior standing. 1 to 5 hours. May be repeated to a maximum of 5 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

292. Senior Thesis

Independent research for seniors in plant biology; prerequisite for graduation with distinction in plant biology and recommended for students intending graduate study. A thesis must be submitted for credit to be received, but graduation with distinction is not an automatic result of enrollment in PLBIO 292. Will substitute for PLBIO 290 in fulfilling independent study requirement. *Prerequisite:* Candidacy for degree with distinction in plant biology.

ogy. 2 to 5 hours. May be repeated to a maximum of 10 hours. Majors in any School of Life Sciences option may count toward graduation no more than a combined maximum of 10 hours of 290, 292, and 294 credit offered by: BIOPH; CSB; EEE; ENTOM; MCBIO; PHYSL; and PLBIO. These hours will not be counted as advanced hours in the option.

304. Evolutionary Survey of the Plant Kingdom

Lecture and laboratory course dealing with the structure, reproduction, and evolutionary origins of land plants as represented by living mosses, liverworts, ferns, lycophytes, horse-tails, conifers, cycads, and flowering plants. *Prerequisite:* PLBIO 100; or BIOL 101, 121, or 251; or consent of instructor. 4 hours or 1 unit.

305. Plants and Global Change

Same as CPSC and NRES 305. See CPSC 305.

330. Plant Physiology

Same as CPSC 330. General course concerned with plant functions, including water relations, mineral nutrition, metabolism, growth, and reproduction. *Prerequisite:* CHEM 231; PLBIO 100 or BIOL 122 or 251. 3 hours or $\frac{3}{4}$ unit.

332. Photosynthesis

Same as BIOPH 332. See BIOPH 332.

333. Plant Physiology Laboratory

Same as CPSC and NRES 333. Laboratory course in plant physiology; a supplement to PLBIO 330 which serves the needs of those interested in acquiring familiarity with techniques of experimental plant physiology. *Prerequisite:* Credit or concurrent registration in PLBIO 330 or equivalent. 4 hours or 1 unit.

335. Plant Development

Mechanisms underlying plant development: cytodifferentiation and the cell cycle, regulation of gene expression, induction, determination, morphogenesis, and pattern formation. *Prerequisite:* Introductory courses in biochemistry, biology, or plant biology, and calculus. 4 hours or 1 unit. Offered in alternate years.

338. Plant Molecular Biology

Same as BIOCH 338. Presents the basic concepts of plant gene expression, the structure and expression of the three plant genomes, and special topics on plant vectors, plant viruses, and transposable elements. *Prerequisite:* BIOCH 350 or consent of instructor. 3 hours or $\frac{3}{4}$ unit. Offered in alternate years.

339. Experimental Techniques in Eukaryotic Molecular Biology

Laboratory course in plant molecular biology supplementing PLBIO 338 with techniques of plant organelle isolation, DNA extraction, cell culture and recombinant DNA techniques. *Prerequisite:* PLBIO 338 or equivalent; or consent of instructor. 4 hours or 1 unit.

341. Field Ecology

Study of plant communities in various sections of North America during spring vacation or intersession. Trips rotate on a three- to five-year basis. Outdoor cooking and camping; transportation in University cars.

Prerequisite: One of the following: PLBIO 260, 366, or 381; consent of instructor. 1 hour or ¼ unit. May be repeated to a maximum of 3 hours or ¾ unit.

345. Plant Anatomy

Lecture and laboratory course dealing with the structural characteristics of mature and developing cells, tissues, and organs of vascular plants, with special emphasis on the vegetative parts of flowering plants. *Prerequisite:* One year of plant biology or equivalent, or consent of instructor. 4 hours or 1 unit.

363. Plant Secondary Metabolism

Lectures on the natural products of plants with emphasis on biosynthesis, distribution and function of relevant compounds of ecological, pharmacological, toxicological, and economic interest. *Prerequisite:* BIOCH 350 or consent of instructor. 3 hours or ¾ unit.

366. Field Botany

Identification and classification of native and naturalized flowering plants of eastern North America. Lecture and laboratory. *Prerequisite:* PLBIO 100 or consent of instructor. 5 hours or 1 unit. Offered in the summer session only.

372. General Mycology

Structure, classification, and identification of fungi, including those of economic importance. Lecture and laboratory. *Prerequisite:* One year of plant biology, entomology, microbiology, or biology; or consent of instructor. 4 hours or 1 unit.

381. Plant Ecology

Principles of ecology exemplified by vegetation and environments of Illinois. Lecture and laboratory. *Prerequisite:* PLBIO 260 or equivalent. 5 hours or 1 unit.

382. Functional Ecology of Trees

Same as NRES 382. Lecture course providing a synthesis of the physiological and morphological mechanisms defining the ecological performance of trees and other woody plants in natural communities. Practical experience with field physiological measurements will be provided. *Prerequisite:* PLBIO 100 or BIOL 121. An additional course in plant ecology or plant physiology (such as PLBIO 330, 381, or NRES 326) is recommended, or the consent of instructor. 3 hours or ¾ unit.

410. Discussions in Plant Biology

All graduate students in plant biology, except those with conflicting teaching assignments, are required to register in and attend the general seminar. 0 or ¼ unit. No credit given except to those students presenting the results of their Ph.D. thesis research.

413. Discussions in Plant Physiology

¼ unit.

414. Discussions in Plant Morphology and Taxonomy

¼ unit.

418. Discussions in Plant Ecology and Plant Geography

Developments in ecology and plant geography, with emphasis on one special division.

Prerequisite: Graduate standing in plant biology, entomology, geography, or biology. ¼ unit. May be repeated to a maximum of 1½ units.

419. Discussions in Photosynthesis and Related Topics

Prerequisite: Consent of instructor. 0 or ¼ unit. May be repeated to a maximum of 1½ units.

424. Plant Biochemistry

Same as CPSC and NRES 424. See CPSC 424.

425. Membrane Transport and Mineral Nutrition in Plants

Same as CPSC and NRES 425. See CPSC 425.

438. Bioenergetics of Photosynthesis

Same as BIOPH 438. See BIOPH 438.

442. Environmental Plant Physiology

Same as CPSC 442. Lecture course dealing with the interaction of plants and environment at the level of the whole organism, extending to the cell and the community; emphasis on heat and mass transfer, plant and soil potentials, and effects of light on growth. *Prerequisite:* CHEM 231; general physics; general or plant physiology; consent of instructor. 1 unit.

471. Advanced Mycology: Special Groups

Several classes of fungi and their activities are considered in successive semesters. Special groups within these classes may be selected for concentrated study, depending upon the student's interest in mycology. *Prerequisite:* PLBIO 372 or consent of instructor. ½ unit.

472. Systematics of Ascomycetes and Fungi Imperfecti

Same as PL PA 472. See PL PA 472.

488. Plant Pigments

Same as NRES 488. See NRES 488.

490. Advanced Studies in Plant Biology

Not more than 2 units may be applied toward the Graduate College master's degree requirement of 3 units of course work at the 400-level. Work may be taken in the following areas: (a) ecology; (b) evolution and systematics; (c) molecular biology and genetics; (d) physiology; and (e) ultrastructure. ½ to 2 units.

499. Thesis Research

Individual work under supervision of members of the staff in their respective fields. 0 to 4 units.

PLANT PATHOLOGY

(See Crop Sciences)

POLISH

(See Slavic Languages and Literature)

POLITICAL SCIENCE

Head of Department: Peter F. Nardulli
Department Office: 361 Lincoln Hall, 702 South Wright Street, Urbana
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Political Science (POL S)

100. Introduction to Political Science

Survey of major concepts and approaches employed in the study of politics. 3 hours.

150. American Government: Organization and Powers

Historical development and organization of national, state, and local governments; the federal system; national and state constitutions; civil and political rights; party system; and nature, structure, powers, and procedure of legislative, executive, and judicial departments in state and nation. 3 hours.

198. Freshman Seminar

Current topics in political science in the context of the scope and method of political science. Participants are required to do independent library research and present a report on a topic of their choice which is related to the subject of the seminar. *Prerequisite:* Consent of instructor. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

222. Introduction to Modern Africa

Same as AFRST, ANTH and SOC 222. See AFRST 222.

230. Introduction to U.S. Racial and Ethnic Politics

Same as AFRO and LLS 230. Efforts by racial and ethnic communities to organize to make political demands, and by society as a whole to allocate resources based on race or ethnicity will be examined. Topical focus will include African Americans, Latinos, Asian Americans, Native Americans, and white ethnics. The primary goal of the course will be to develop a more comprehensive understanding of racial and ethnic politics by identifying commonalities and differences among these groups and their relationship to the state. 3 hours.

235. Women in Politics

Same as WS 235. Introduction to the political status and roles of women. Topics include

women's political socialization, voting behavior, and political participation; feminist and anti-feminist politics; and contemporary legislative and public policy issues, such as educational equity, equal rights legislation, and health care delivery for women. *3 hours.*

240. Introduction to Comparative Politics
Basic concepts and principles of political analysis from a comparative perspective. *Prerequisite:* POL S 100 or 150, or consent of instructor. *3 hours.*

241. The Emerging Nations
Introductory comparative consideration of the patterns of political development and of the policies and problems of the emerging nations of Asia, Africa, and Latin America; emphasis on the special characteristics of countries beginning their independent nationhood and the effects of these characteristics on the political systems of these lands and their role in the community of nations. *Prerequisite:* Three hours of political science or consent of instructor. *3 hours.*

243. Pan Africanism in the Americas, Europe, and Africa
Same as AFRST and AFRO 243, and SOC 267. Introduction to Pan African political movements and ideologies from the Americas to continental Africa. Examines the political, social, economic, and ideological relationships and connections between Africans and their descendants in the diaspora from an historical and comparative perspective. *3 hours.*

250. Introduction to Public Policy
Surveys the policy process including adoption, implementation, and evaluation; each student prepares a research paper: topics include reviews of substantive policy issues such as crime, energy, environment, poverty, foreign policy, civil liberties, or economic regulation. *Prerequisite:* POL S 100 or 150, or consent of instructor. *3 hours.*

260. Introduction to Political Theory
Nature, structure, and purposes of political theory; uses major works on the problems of political order, obedience, justice, liberty, and representation to distinguish and clarify different theoretical approaches; designed to be an introduction to ideas, not a historical survey. *Prerequisite:* POL S 100 or 150, or consent of instructor. *3 hours.*

270. Introduction to Political Research
Principles of empirical research in political science; emphasizes definition of research problems, principles and practices of measurement, use of data as evidence, and data analysis; data-based analysis is conducted in the Office of Computing and Communications for the Social Sciences. *Prerequisite:* POL S 100 or 150, or consent of instructor. *3 hours.*

280. Introduction to International Relations
Structure and processes of international relations, trends in international politics, and the future of the international system in a setting of conflict and crisis. *Prerequisite:* POL S 100 or 150, or consent of instructor; completion of campus Composition I general education requirement (applies to writing-intensive sections only). *3 hours.*

281. Introduction to International Security and Arms Control
Introduction designed for all students to major issues of arms control, disarmament, and international security. The military, socio-economic, and political effects of nuclear and conventional weapons, military strategy, the ethics of modern warfare, nuclear proliferation, and regional security issues will be studied. *3 hours.*

282. Politics and Policy in the Vietnam War: Unit One Seminar
Introductory-level course dealing with continuing questions about the war in Vietnam and the era during which it was fought. Focuses on official policy questions, such as the decision making process, the legality of the war, the question of war crimes, and lessons for international relations. Domestic issues, such as the rise and effect of the antiwar movement, are also discussed. *Prerequisite:* Allen Hall residency or consent of Unit One director. *3 hours.*

287. Nature, Society, and Democracy
Same as NRES 287. See NRES 287.

290. Individual Study
Special topics not treated in regularly scheduled courses; designed primarily for juniors and seniors. *Prerequisite:* Evidence of adequate preparation for such study; consent of faculty member supervising the work; and approval of the department head. *1 to 4 hours.* May be repeated. (Counts for advanced hours in L.A.S.)

292. Senior Thesis in International Relations
Prerequisite: Written consent of instructor; senior standing; major in political science, studying international relations. *3 to 5 hours.* May be repeated. (Counts for advanced hours in L.A.S.)

293. Honors Senior Thesis
Prerequisite: Written consent of instructor; open only to seniors whose major is political science and who have a general University average of at least 3.0. *2 to 5 hours.* May be repeated. (Counts for advanced hours in L.A.S.)

295. Special Topics in Contemporary Issues and Problems
Study of a contemporary problem in public policy, domestic or international. See *Timetable* for current topics. *Prerequisite:* Sophomore standing, 3 hours of political science, or consent of instructor. *3 hours.* May be repeated for credit.

296. Special Topics in Political Science
Selected reading and research in political science. See *Timetable* for current topics. *Prerequisite:* Junior or senior standing; 6 hours of political science; consent of instructor. *3 hours.* No more than 6 hours of credit may be earned by registration in this course and in POL S 297. (Counts for advanced hours in L.A.S.)

297. Honors Seminar
Research, reading, and discussion in selected topics and works in literature of political science. *Prerequisite:* Senior standing; 18 hours

of political science; 3.5 GPA in political science; consent of instructor. *3 hours.* No more than 6 hours of credit may be earned by registration in this course and in POL S 296. (Counts for advanced hours in L.A.S.)

299. Government Internship
Selected Government Internship participants together with faculty sponsor develop a program of study and research related to internship assignment. Consult departmental undergraduate adviser. *Prerequisite:* Junior standing; 3.0 grade average for most internships; POL S 150 and one 300-level political science course appropriate to internship program; acceptance by faculty sponsor. *0 to 6 hours.* May be repeated to a maximum of 12 hours.

300. Socio-Economic Management as Public Policy
Same as ACCY 322, B ADM and SOC S 300. Examination of performance-oriented approaches to administration of public sector organizations; private sector accountability principles applied to governmental agencies; means of improving the performance of governmental agencies; corporate social responsibility; public policy implications of computer usage and individual privacy; and actual cases reviewed and discussed. *Prerequisite:* Consent of instructor. *3 hours or 1 unit.*

305. Municipal Government
Growth of cities; their legal status; and municipal politics and organization in the United States. *3 hours, or ½ or 1 unit.*

306. Municipal Problems
Municipal administration in the United States; administrative organization; personnel problems; financial problems; city planning and housing; police and fire administration; public health; and public utilities. *Prerequisite:* Senior standing, or junior standing with POL S 305 or ECON 101, or 6 hours of political science. *3 hours, or ½ or 1 unit.*

312. State Government
Survey of the origins and evolution of state government in the United States. Special emphasis is placed on the ways that state and local intergovernmental relations and citizen participation have impacted in the contemporary post-New Deal period. Topics include history, structure and political dynamics of state constitutionalism, laws and the judiciary, state legislatures, political parties, organized interests, public administration, bureaucracies, demographic dispersion and electoral patterns, conflicts, and coalitions. Examples from all fifty states will be included, with emphasis on the State of Illinois. *Prerequisite:* POL S 100 or 150. *3 hours or ¾ unit.*

314. The Presidency
Determinants and growth of presidential influence; presidential decision making; the president's role in the formulation and implementation of public policy; the president and constituencies; and the president's roles as legislator, party leader, and chief executive. *Prerequisite:* POL S 100 or 150. *3 hours, or ½ or 1 unit.* Graduate credit is not given for both POL S 314 and 451.

315. Legislatures and Legislation

The legislative function in government; structure and organization of American legislatures (national, state, and local); party organization in legislatures; legislative procedure; pressure groups and lobbying; relation of legislature to other branches of government; and problems of legislative reorganization. *Prerequisite:* Six hours of political science. 3 hours, or ½ or 1 unit. Graduate credit is not given for both POL S 315 and 452.

317. The American Federal System

The nature, justification, and problems of federalism; coordination of governmental efforts by contract, subsidies, and grants; and comparison of federal systems. *Prerequisite:* POL S 150. 3 hours, or ½ or 1 unit.

322. Politics and the Media

Same as COMM 322 and SPCOM 325. See SPCOM 325.

325. Latina/Latino Politics

Same as LLS 325. Examines the role of Latino electorates in shaping state and national politics. Review of histories of Latino national origin groups, examination of public policy issues of concern to Latinos, successes and failures of Latino empowerment strategies, and the electoral impact of Latino votes. Focus will be primarily on Mexican Americans, Puerto Ricans, and Cuban Americans and an assessment of the degree to which their political agendas are likely to merge over the coming years. *Prerequisite:* Six hours of Political Science credit. 3 hours or 1 unit.

326. American Political Parties

Organization and operation of the American party system; relations between national, state, and local organizations; state and national committees; the convention systems; the primary; and campaign methods and finance. *Prerequisite:* POL S 150 or consent of instructor. 3 hours, or ½ or 1 unit. Graduate credit is not given for both POL S 326 and 455 or 457.

327. Black Political Participation in the American Political Process

Same as AFRO 327. Role of race in stimulating change in American political life; types of strategies employed in the civil rights struggle; how race affects Black electoral participation and the broader political and economic conditions of Black Americans. *Prerequisite:* POL S 150, or six hours of social science, or consent of instructor. 3 hours, or ½ to 1 unit.

328. An Introduction to the Study of Political Behavior

Analysis of the interrelations of political attitudes and public opinion formation; special attention to the substantive areas of voting behavior, political leadership, and the rise of political mass movements; and also a review of the literature on democratic and authoritarian personality types. *Prerequisite:* POL S 150 or equivalent. 3 hours, or ½ or 1 unit. Graduate credit is not given for both POL S 328 and 456.

329. Electoral Behavior

Study of the social and psychological motivations behind the individual voting decision, with special emphasis on the relationships between the voting decision and social stability. *Prerequisite:* Six hours of political science. 3 hours, or ½ or 1 unit. Graduate credit is not given for both POL S 329 and 455 or 456.

331. British Government

Nature of the British Constitution; the Crown, Ministry, and Cabinet; Parliament and elections; the party system; law and the courts; local government; and the British Commonwealth. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

332. African Independence and Underdevelopment: 1945 to the Present

Same as HIST 385. See HIST 385.

335. Government and Politics of Russia and Other Post-Soviet Successor States

Evolution, structure, and functioning of the Soviet system of government; the theories, structure, and functioning of the Communist party of the Soviet Union. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

336. Governments and Politics in Western Continental Europe

Analysis of the major governmental systems of continental Europe; the evolution, structure, and functioning of the political institutions of France, Germany, Italy, Spain, Switzerland, and the Scandinavian countries. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

337. Government and Politics of China

Same as EALC 337. Introduction to the government and politics of modern China. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

338. Governments and Politics in the Middle East

Same as AS ST 338. Analysis of the transformation of Middle Eastern society from Morocco to Iran, as case studies in political modernization; study of politics of the area with special reference to causes and character of modernization, role of leadership, ideologies and institutions, methods and theories for analyzing political systems undergoing fundamental transformation, and implications for U. S. policy. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

339. Islam and Society in the Modern Middle East and North Africa

Same as RELST 308. See RELST 308.

340. The German Political System

Structures and processes of postwar German politics, with primary emphasis on West Germany; special attention to foreign policy formulation and problems (particularly defense), the Berlin issue, reunification, and relations with Eastern Europe. Knowledge of German helpful but not necessary. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

342. Government and Politics in Latin America

Survey of the origin and development of Latin American political institutions; systems of government; public administrative systems; party government; and international policies of Latin American governments. *Prerequisite:* Six hours of political science or consent of instructor. 3 hours, or ½ or 1 unit.

343. Political Systems and Structures of Latin American Countries

The political process of selected Latin American countries at different levels of political development; stress on the interaction between political infrastructure and more formal agencies of government; and may include cross-national comparison of the function of such factors as political culture, party system, bureaucracy, or the military establishment. *Prerequisite:* POL S 342 or consent of instructor. 3 hours, or ½ or 1 unit.

345. Government and Politics in Sub-Saharan Africa

Examines contemporary economic, social, and political processes focusing on three basic explanatory themes: historical patterns of development; emerging patterns of class and interest; and leadership strategies. *Prerequisite:* POL S 222 or 6 hours of political science or consent of instructor. 3 hours or ½ to 1 unit.

346. Government and Politics of East Central Europe

Analysis of the origins of modern communism and the development of its doctrines; applications of these doctrines in the practices of ruling Communist parties; emphasis alternates between European and non-European Communist systems, depending on course instructor. *Prerequisite:* POL S 240 or consent of instructor. 3 hours, or ½ or 1 unit.

347. Governments and Politics of Southeast Asia

Same as AS ST 347. Comparative analysis of the political development of the countries of Southeast Asia, the lands to the east of India and south of China; emphasis on differing approaches to the governance and formation of public policy in these countries; and consideration of economic, social, historical, and cultural influences on political development. *Prerequisite:* POL S 240 or consent of instructor. 3 hours, or ½ or 1 unit.

348. Government and Politics of Japan

Same as EALC 348. Introduction to the government and politics of modern Japan. *Prerequisite:* POL S 240 or consent of instructor. 3 hours, or ½ or 1 unit.

349. Governments and Politics of South Asia

Same as AS ST 349. Comparative analysis of the political development of India, Pakistan, Sri Lanka, and the lesser lands of South Asia; emphasis on the differing approaches to governance and formation of public policy in these countries; and consideration of economic, social, historical, geographical, and cultural influences on political development. *Prerequisite:* POL S 240 or consent of instructor. 3 hours, or ½ or 1 unit.

350. Law and Society

Introductory study from a social science perspective of the nature of law, law makers, and law appliers; the causes or inputs determining law; and the effects or outputs which law in general produces. *Prerequisite:* Junior standing. 3 hours, or ½ or 1 unit.

351. American Constitutional System

Judicial interpretation of constitution; separation of governmental powers; relation of state and national governments; control of interstate commerce; and jurisdiction of courts. *Prerequisite:* POL S 150. 3 hours, or ½ or 1 unit. Graduate credit is not given for both POL S 351 and 453.

354. The Judicial Process

Systematic analysis of legal, evidentiary, environmental, and personal factors that influence judicial decision making, with particular emphasis on the application of the scientific method to the study of judicial behavior. *Prerequisite:* POL S 150. 3 hours, or ½ or 1 unit. Graduate credit is not given for both POL S 354 and 453.

355. The Constitution and Civil Liberties

Study of free speech, loyalty in a democratic state, citizenship, freedom of religion, rights of persons accused of crime, and government's responsibility to protect persons from racial and religious discrimination; and special attention to the role of law and judges. *Prerequisite:* POL S 150. 3 hours, or ½ or 1 unit.

357. Human Rights

Same as SOC 357. See SOC 357.

359. Contemporary Supreme Court Policy Making

Studies how the modern Supreme Court has resolved major issues in American constitutional politics. *Prerequisite:* Consent of instructor; POL S 351 or 355 or SOC 358. 3 hours or 1 unit.

361. Introduction to Public Administration

Development of administrative organization; administration and the executive, legislature, and judiciary; principles of organization, including line and staff relationships; the staff services of finance and personnel; and formal and informal control. *Prerequisite:* POL S 150. 3 hours, or ½ or 1 unit.

370. Selected Topics on Women and Politics

Same as W S 370. Variable topics relating to the political roles and status of women, emphasizing the areas of comparative politics, political theory, political behavior, and international politics. See *Timetable* for current topics. *Prerequisite:* POL S 235 or consent of instructor. 3 hours or 1 unit. May be repeated once for credit.

371. International Organization

General development and basic principles of world organization; principles, structure, methods, and actual operation of international governmental institutions; and special attention to the United Nations and related agencies and to their evolution from the League of Nations system. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

375. Politics of the Global Economy

Examines the interaction between politics and economics; locates ideologies and practices in the context of international economic relations. Considers such topics as international trade, the global monetary order, multinational corporations, economic aid relationships, and food and energy politics. *Prerequisite:* POL S 240 or 280. 3 hours or 1 unit.

376. Comparative Political Economy

Examines the effect of domestic political processes on economic performance, including monetary, fiscal, and trade policies. Topics include partisan influences on policy, interest group intermediation, political accountability for economic outcomes, and consequences of product and capital market internationalization. *Prerequisite:* POL S 240 or 280 and ECON 101 or 103. 3 hours or 1 unit.

377. International Communications

Same as COMM 377. Interdisciplinary approach to international communications; its structure and content; the role of international communications in conflict and conflict resolution; the semantics of international communication; the technical and economic aspects of international mass communications; and government-industry relations in communications. *Prerequisite:* POL S 280 or 6 hours of social science, or consent of instructor. 3 hours, or ½ or 1 unit.

382. Contemporary American Foreign Policies

Study of the major foreign policy decisions currently confronting the United States government: analysis of background, principal issues, and alternative actions; formulation of policies. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

383. Soviet and Post-Soviet Foreign Policy

Survey of Soviet foreign policy from 1917 to the present, with emphasis upon the forces shaping this policy; special attention to the interplay of ideology and national interest in policy formulation. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

384. International Relations

Examination of contemporary international systems in terms of the types of actors and their goals, various structures of power, and the mechanisms of allocating resources and containing conflict. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

385. International Law

Analyzes the concepts and bases of public international law; topics include sources and subjects of international law, as well as issues of jurisdiction, territory, law of the sea, and use of military force. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

386. International War and Peace

Examination of the conditions that promote war and peace between states. General topics covered are: historical patterns in warfare; causes of war, including arms races and power distributions; outcomes of war; and approaches to peace. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

387. National Security Policy

Examination of the organization and formulation of current American defense policy, the theory and practice of deterrence, and the problems of disarmament and arms control. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

388. Government and Politics of the Global Society

Examines the basic concepts and politics associated with the emergence of the global society. Students evaluate divergent theoretical explanations for the emergence of this new politics and how and why the global society governs itself. It examines the strengths and shortcomings of the nation-state, markets, and democratization as responses to the imperatives of order, welfare, and legitimacy in the governance of peoples and states. *Prerequisite:* POL S 280 or equivalent or consent of instructor. 3 hours, or ½ or 1 unit.

389. Chinese Foreign Policy

Same as EALC 385. Analysis of the formulation, substance, and conduct of Chinese foreign policy, with emphasis on the period since 1949; special attention to the forces shaping Chinese policy. *Prerequisite:* POL S 280 or consent of instructor. 3 hours, or ½ or 1 unit.

390. Methods of Political Analysis

Presentation of the analytic processes in the development of concepts, hypotheses, and theories; discussion of the derivation, formulation, and specification of research problems to be related to basic methodologies and modes of analysis; and applications to political science. *Prerequisite:* POL S 270, or consent of instructor. 3 hours, or ½ or 1 unit.

391. Topics in Non-Western Political Thought

Considers political thought outside of the Greco-Roman, European, and North American tradition; each semester focuses on the political thought of a specific region. 3 hours or 1 unit. May be repeated as topics vary.

392. Socialist Political Theory

Origins, development, and recent modifications of socialist theory from the late eighteenth century to the present; examination of each contribution in terms of its goals, efficacy, and subsequent influence; and discussion including Rousseau, Hegel, the Utopians, Marx and Engels, Anarcho-Syndicalists, Lenin, Luxemburg, Trotsky, Mao, Guevara, and Garaudy. *Prerequisite:* POL S 260 or consent of instructor. 3 hours, or ½ or 1 unit.

393. Classical Political Theory

Consideration of major works of Greek and Roman political theory, and especially of their relevance to modern political analysis and action. *Prerequisite:* POL S 260 or consent of instructor. 3 hours, or ½ or 1 unit.

395. Modern Political Theory

Critical analysis of political theories from the sixteenth century to the present; focus on the development of conceptions of human nature, the role of the state, justice, legitimacy, obligation, individual rights, equality, and mechanisms of maintenance and change.

Prerequisite: POLS 260 or consent of instructor. 3 hours, or ½ or 1 unit.

396. Topics in Contemporary Political Theory

Examines specific topics and writers of contemporary political theory. Recent themes have included conceptions of power, rights, justice, and radical political thought. *Prerequisite:* POLS 260 or consent of instructor for political science students. No prerequisites for 3rd or 4th year students from other departments or for graduate students. 3 hours, or ½ to 1 unit. May be repeated in the same semester to a maximum of 6 hours or 2 units, or may be repeated in subsequent semesters to a maximum of 9 hours or 3 units as topics vary.

397. American Political Theory

Survey of American political thought from colonial times to the present. *Prerequisite:* POLS 260 or consent of instructor. 3 hours, or ½ or 1 unit.

398. Theory and Practice of Democratic Government

Theories of the nature and conditions of democracy; comparison and analysis of contemporary democratic institutions. *Prerequisite:* POLS 260 or consent of instructor. 3 hours, or ½ or 1 unit.

400. Selected Topics in Political Theory

Reading, analysis, and discussion of selected topics of political theory. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 2 units.

401. History of Political Theories

Reading and analysis of the leading political thinkers from the Greeks to the middle of the seventeenth century. 1 unit.

402. History of Political Theories

Readings and analysis of the leading political thinkers from the middle of the seventeenth century to the present. 1 unit.

410. Theory of Institutions

Discussion of contemporary theories about the impact of democratic institutions on politics and policy with applications throughout the politics of advanced industrial democracies. The seminar will cover six major schools: rational-choice treatments, the new economics of organization, garbage can models, sociological approaches, historical institutionalism, and statism, and will contrast these both with the old institutionalism and with approaches to politics that minimize the importance of institutions. 1 unit.

427. Introduction to Quantitative Political Analysis

Introduction to problems of research design, data collection, data analysis and interpretation, sampling, and some simple measures of statistical association and significance. 1 unit.

428. Multivariate Analysis for Political Scientists

Applied use of extended analysis of variance; multiple classification analysis, factor and small-space analysis, causal analysis, multiple regression, and selected topics for research.

Prerequisite: SOC 387, POL S 427, or consent of instructor. 1 unit.

430. Proseminar in Comparative Politics

Comparative political analysis in the context of the evolution of the social sciences and modern political science, with emphasis on theories of political action and their function in contemporary comparative studies. This course is designed as an introduction to area-oriented seminars and generally is a prerequisite for them. 1 unit.

431. Theories of Comparative Politics

Study of a series of major works in comparative politics written since World War II, particularly within the tradition of comparative-historical analysis. Discussion is organized around core concepts and theoretical schools, and obeys a roughly chronological order. Issues of methodology will be stressed throughout the seminar. *Prerequisite:* Completion of POLS 430 is recommended. 1 unit.

435. Global Democratization

Study of the roles of domestic and international factors, modes of transition, institutional choices and economic reforms in the transition from authoritarian rule. Comparisons are made of cases in Southern and Eastern Europe, Latin America, East Asia, the former Soviet Union, and others. *Prerequisite:* Completion of POLS 430 or 431 is recommended. 1 unit.

440. Comparative Politics and the Political Process

Comparative study of selected political systems or of specific institutional forces that influence the making and application of public policy in several countries. The countries studied and the legal and extralegal political agencies considered vary according to the person conducting the seminar. 1 unit. May be repeated to a maximum of 3 units.

441. Seminar in African Government and Politics

Advanced research seminar. Focus will alternate among such topics in African politics as: (a) the politics of agriculture, (b) state and society, (c) African political systems and the challenge of democratic practice, and (d) political and economic crisis in Sub-Saharan Africa. *Prerequisite:* POLS 222 and 345 or consent of instructor. 1 unit. May be repeated as topics vary to a maximum of 3 units.

442. Comparative Politics of Post-Soviet States

Study of states which have experienced extended interludes of communist power, especially including the new states of the former Soviet Union, the post-communist regimes of Eastern Europe and China, through a comparative examination of political, economic, and ethnopolitical problems of regime transformation. Analytic and research papers required. *Prerequisite:* Completion of POLS 430 or 431 is recommended. 1 unit.

450. Proseminar in American Politics

Intensive analysis of major institutions and processes of American politics (national, state, and local); research on selected topics in American government. 1 unit.

451. Seminar on the United States Presidency

Introduction to the literature and research topics on the American Presidency; includes presidential relations with the public and mass media, other governmental institutions and elites, and decision processes in the White House. *Prerequisite:* Graduate standing. 1 unit. Graduate credit is not given for both POLS 451 and 314.

452. Seminar on the U.S. Congress

Traces the development of Congress as an institution with special attention to the role of norms; considers intra-institutional aspects of Congress including committee decision-making, floor voting, and leadership; examines congressional relationships with other actors including the presidency and Supreme Court, interest groups, and constituents. *Prerequisite:* Graduate standing. 1 unit. Graduate credit is not given for both POLS 452 and 315.

453. Seminar on Law and Politics

Legal institutions, legal decision-making, and constitutional politics in the American setting; includes both theoretical and methodological aspects of the law and politics literature. *Prerequisite:* Graduate standing. 1 unit. Graduate credit for is not given for both POLS 453 and POLS 351 or 354.

455. Seminar on Political Parties and Elections

Role of political parties and elections in the political process; traces the evolution of American parties as a political institution, assesses their impact upon the policy-making processes, and considers macro-level influences upon the electoral process. *Prerequisite:* Graduate standing. 1 unit. Graduate credit is not given for both for POLS 455 and POLS 326 or 329. 1 unit.

456. Seminar on Mass Political Behavior

Covers the scholarly literature on, and the research techniques used to study, political participation, electoral behavior, political socialization, and public opinion. *Prerequisite:* Graduate standing. 1 unit. Graduate credit is not given for both POLS 456 and 328 or 329.

457. Collective Action and Interest Groups

Broad analysis of collective action, interest groups, and politics; examines the meaning of political interests and the forms they take; reviews various approaches to the study of interest groups; analyzes the formation and operation of interest groups; reviews research in the policy areas of housing, agriculture, race, and gender at a variety of institutional levels; examines innovation and change in interest group politics and research. *Prerequisite:* Graduate standing. 1 unit. Graduate credit is not given for both POLS 457 and 326.

459. Contemporary Governmental Problems

Special problems of current importance designed especially for students majoring in political science. 1 unit. May be repeated to a maximum of 3 units.

460. Individual Behavior in Organizations

Same as B ADM 410, PSYCH 453, and SOC 456. See B ADM 410.

460. Organizational Sciences, I
Same as B ADM 410, PSYCH 453, and SOC 456. See B ADM 410.

461. Formation of Public Policy
Same as L I R 420. Examination of the institutional and dynamic forces that shape the making of policy and its administration in the United States; separation of powers, pressure groups, administrative and legislative procedures, and judicial activity. *1 unit.*

480. Scope and Theory in International Relations
Deals with the field of international relations, its relationship to political science and the other social sciences; treats the development of the field by examining major theories and approaches that have characterized it in the past, but with emphasis on contemporary theories and concepts. *1 unit.*

481. Methodology in International Relations
Deals with major research methodologies in contemporary international relations; includes case studies, aggregate data, content analysis, survey research, gaming and simulations, and causal modeling; and presumes knowledge of basic international relations theory. *Prerequisite:* POL S 480. *1 unit.*

483. International War
Focuses on the conditions that influence war and peace between nation-states. Considers various factors at different levels of analysis (individual, national, dyadic, and systematic) in an attempt to understand why nations go to war. Readings will consist of current research in this topic area (without ignoring, however, certain "classical" theoretical approaches). *Prerequisite:* POL S 480. *1 unit.*

484. International Organizations
General development and operations of international organizations with special emphasis on United Nations and related agencies. Focuses on activities in security, economic, and social issue areas. *Prerequisite:* POL S 480. *1 unit.*

485. International Political Economy
Comprehensive introduction to major traditions in contemporary thought on the political structure and workings of the global economy. Presumes background knowledge pertaining to the workings of the international economy and its institutions as well as familiarity with the assumptions and approaches of classical I. P. E. thought and International Relations theory. *Prerequisite:* POL S 480. *1 unit.*

486. Comparative Foreign Policies
Focuses on the formulation and implementation of foreign policy within the state, first as an international phenomenon, and second as a national one for specific states (e.g., United States, Russia, India, China, Japan, etc.). *Prerequisite:* POL S 430 or 480. *½ or 1 unit.*

489. International Relations: Special Problems in Theory and Research
Advanced seminar on special topics in international relations. *Prerequisite:* POL S 480 or 481, or consent of instructor. *1 unit.* May be

repeated under different instructors to a maximum of 3 units.

490. Proseminar in Political Behavior, I
Interdisciplinary approaches to the analysis of political behavior; formation of opinions, interests, roles, and personality; applications of organization theory to political institutions; applications of conflict and bargaining theory to political processes; and systematic studies of the distribution of values. *1 unit.*

491. Proseminar in Political Behavior, II
Continuation of POL S 490. *Prerequisite:* POL S 490. *1 unit.*

492. Problems of Explanation in Social Science
Special topics in the methodology of social sciences, especially theory formation and theory testing. *1 unit.* May be repeated as topics vary to a maximum of 2 units.

493. Research in Selected Topics
Research in selected topics by arrangement with the instructor. *½ to 3 units.*

494. Dissertation Design Seminar
Addresses the basic steps involved in the development of a dissertation proposal; aims to facilitate the completion of the dissertation proposal for students who have passed the qualifying examinations. *Prerequisite:* Successful completion of required qualifying examinations. *0 units.*

495. Philosophical Bases of Political Inquiry
Definitions of the scope and subject matter of political science; methodological issues in political science; major conceptions of methodology as embodied in current leading studies of politics; and the present state of research in political science. *Prerequisite:* Graduate standing. *1 unit.*

496. Research Design and Techniques
Indicates the relevance of certain research techniques for answering questions of concern in political science; indicates the range of tools available to the student; and includes discussion of problems in concept formation. Presents current methods of concept measurement in the context of political research problems. *Prerequisite:* POL S 495 or consent of instructor. *1 unit.*

498. The Logic of Political Inquiry: Selected Topics
Application of analytic principles and procedures developed in POL S 495 to such topics as patterns of explanation; current theoretical perspectives; group theory, functionalism, systems theory, decision making, simulation, etc; the logic of judicial decisions; and justifications of political ideologies. This list is not exhaustive, nor will all of these topics be included each semester. *Prerequisite:* POL S 495. *1 unit.* May be repeated to a maximum of 2 units.

499. Thesis Research
0 to 4 units.

PORTUGUESE

(See Spanish, Italian, and Portuguese)

PRINTMAKING

(See Art and Design, School of)

PSYCHIATRIC NURSING

(See Nursing)

PSYCHOLOGY

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Psychology (PSYCH)

100. Introduction to Psychology
Study of human behavior with special reference to perception, learning, memory, thinking, emotional life, and individual differences in intelligence, aptitude, and personality; emphasis on the scientific nature of psychological investigations; and discussion of research methods and the relation of their results to daily life and everyday problems. Lectures, discussions, and five hours of participation as a subject in psychological experiments. *4 hours.* Credit is not given for both PSYCH 100 and PSYCH 103.

102. Psychology Orientation
Lectures designed to acquaint the psychology major with the various specializations available in the field, career exploration procedures, and a wide range of opportunities of special interest to psychology students. Recommended for freshmen in psychology. *0 hours.*

103. Introduction to Experimental Psychology

Surveys basic topics in experimental psychology; emphasizes perception, learning, memory, motivation, emotion, cognition, language development, and decision-making. Uses simple laboratory experiments to investigate these topics. 4 hours. Credit is not given for both PSYCH 103 and PSYCH 100.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Introduction to Social Psychology

Systematic study of social factors in individual and group behavior; attention to social perception, motivation, and learning; attitudes, norms, and social influence processes; the development and dynamics of groups; and the effects of social and cultural factors on the individual. *Prerequisite:* PSYCH 100 or 103. 3 hours. Credit is not given for both PSYCH 201 and SOC 201.

210. The Brain and the Mind

Survey of current knowledge and speculation regarding the brain's role in perception, motivation, sexual behavior, thinking, memory, and learning, based upon human clinical data and research in animal models. *Prerequisite:* PSYCH 100, 103, or consent of instructor. 3 hours.

211. Techniques of Biological Psychology

Introduction to research techniques used in the physiological study of mental processes; includes recording "brain waves," behavioral analysis of drug and lesion effects, anatomy of the brain, hormones and behavior, and related topics. *Prerequisite:* Credit or concurrent registration in PSYCH 210, or consent of instructor. 2 or 3 hours.

214. Introduction to Aging

Same as CHLTH, HDFS, LEIST, and REHAB 214. See HDFS 214.

216. Child Psychology

Study of the psychological development of the child. *Prerequisite:* PSYCH 100 or 103. 3 hours. Credit is not given for both PSYCH 216 and EDPSY 236.

217. Comparative Development

Survey of phylogenetic and ontogenetic development of behavior. The first part of the course considers the comparative psychology of representative phyla, with special emphasis on the development of sensorimotor coordination, motivation, and learning. The second half of the course is concerned with development of behavior in the individual organism, with most attention devoted to behavioral changes during the life span of vertebrate organisms. *Prerequisite:* PSYCH 100 or 103. 3 hours.

224. Cognitive Psychology

Introduction to the psychological study of human information processing and memory; acquisition, retrieval, and forgetting; and general knowledge, concepts, reasoning, and related issues in cognition. *Prerequisite:* PSYCH 100 or 103. 3 hours.

230. Perception and Sensory Processes

Survey of the experimental psychology of sensory and perceptual processes and behavior; emphasis on the contribution of behavior science to understanding subjective experience of the physical and social environment. *Prerequisite:* An introductory course in psychology, physiology, or animal biology. 3 hours.

231. Research Methods in Experimental Psychology

Studies experimental laboratory methods as related to applied and basic psychological questions; material includes: research methodology, scientific problem solving, literature search, scientific writing, experimental design, basic data analysis, and research laboratory experience. *Prerequisite:* PSYCH 100 or 103. 4 hours.

233. Descriptive Statistics

Descriptive statistics, including measures of central tendency and dispersion, correlation, probability, transformations, and basic distribution theory; basic principles of sampling and research design. *Prerequisite:* PSYCH 100 or 103; college algebra or equivalent; or consent of departmental academic adviser. 3 hours. Students may not receive credit for PSYCH 233 and PSYCH 235, ECON 171 or 172, SOC 185 or 385, STAT 100 or 210 or EDPSY 390. (Offered by correspondence only.)

234. Inferential Statistics

Inferential statistics, including sampling distributions estimation, hypothesis testing, regression, correlation, and basic analysis of variance procedures. *Prerequisite:* PSYCH 233. 2 or 3 hours. Students who have earned credit in ECON 171 or 173, STAT 100 or 210, SOC 185, or EDPSY 390 receive 2 hours credit in PSYCH 234. Students may not receive credit for both PSYCH 234 and 235. (Offered by correspondence only.)

235. Introduction to Statistics

Development of skill and understanding in the application of statistical methods to problems in psychological research; topics include descriptive statistics, probability, estimation, basic inferential methods, regression, correlation, and basic analysis of variance procedures. Laboratory includes discussion of problems and application of statistical methods to data from experiments and surveys. *Prerequisite:* PSYCH 100 or 103; college algebra or equivalent; or consent of departmental academic adviser. 2 or 5 hours. Students who have earned credit in ECON 171, 172, or 173, STAT 100 or 210, SOC 185 or 385, or EDPSY 390 receive 2 hours credit in PSYCH 235. Students may not receive credit for both PSYCH 235 and either PSYCH 233 or 234.

238. Abnormal Psychology

Conceptions and facts about disordered behavior, including psychoses, neuroses, and other patterns of psychological disturbance. *Prerequisite:* PSYCH 100 or 103. 3 hours.

239. Community Psychology

Redefines human and social problems and the implications for social programs and policies; reviews the historical antecedents, conceptual models, strategies and tactics of social and

community programs; and employs examples from selected social systems (e.g., criminal justice, education, employment, and mental health). *Prerequisite:* PSYCH 100 or 103. 3 hours.

240. Psychology of Gender

Same as W S 220. Conveys a basic knowledge of current research and issues in the psychology of gender. A wide range of topics including biological, cognitive familial and societal influences on gender role formation and development will be examined. *Prerequisite:* PSYCH 100 or equivalent. 3 hours.

245. Industrial Organizational Psychology

Systematic study of the application of psychological methods and principles in business and industry; emphasis on personnel selection and factors influencing efficiency. *Prerequisite:* PSYCH 100 or 103; credit or concurrent registration in a statistics course. 3 hours.

248. Psychology of Learning and Memory

Survey of basic phenomena in learning and memory emphasizing experimental data from animal and human research. *Prerequisite:* PSYCH 100 or 103. 3 hours.

250. Psychology of Personality

Study of personality from various points of view: biological, experimental, social, and humanistic; surveys theory and empirical research in the study of personality. *Prerequisite:* PSYCH 100, 103. 3 hours.

258. Human Factors in Human-Machine Systems

Same as AVI 258 and I E 240. Introduction to human factors, ergonomics, engineering psychology, history of ergonomics, human-machine relations, displays and controls, human-computer interaction, industrial and aviation systems, physiology of work and anthropometrics, cognitive ergonomics, human reliability, human as manual controller, human-machine systems design, prototyping, professional practice and ethics, laboratory exercises. *Prerequisite:* PSYCH 100, 103, or consent of instructor. 4 hours.

260. American Sign Language

Same as LING, SP ED, and SPSHS 260. See SP ED 260.

290. Special Topics

Supervised participation in research and scholarly activities usually as an assistant to an investigator. *Prerequisite:* Ten hours of psychology or cognate area, or written consent of instructor. 1 to 4 hours. May be repeated to a maximum of 9 hours.

291. Honors Individual Study

Prerequisite: Junior standing; admission to psychology honors program. 2 to 4 hours. May be repeated to a maximum of 10 hours. (Counts for advanced hours in L A S.)

293. Honors Senior Thesis

Planning, researching, and writing of an undergraduate honors thesis, under supervision of a faculty member, on a problem of appropriate scope and character. *Prerequisite:* PSYCH 297. 2 to 4 hours. (Counts for advanced hours in L A S.)

294. Individual Topics

Supervised independent investigation of special topics in psychology; requires a written report with a final copy submitted for departmental records. *Prerequisite:* Ten hours of psychology or cognate area, or written consent of instructor. 1 to 4 hours. May be repeated to a maximum of 9 hours. (Counts for advanced hours in L.A.S.)

297. Junior Honors Seminar

Seminar on experimental methods and contemporary psychological research. *Prerequisite:* Junior standing and admission to departmental honors program. 0 to 4 hours. (Counts for advanced hours in L.A.S.)

298. Senior Honors Seminar

Continuation of PSYCH 297. *Prerequisite:* PSYCH 297. 0 to 4 hours. May be repeated. (Counts for advanced hours in L.A.S.)

300. Psychology for Medical Students and Health Professionals

Advanced treatment of psychological concepts with an emphasis on their interaction with medicine. Topics include: perception, learning, memory, thinking, emotions, and individual differences; psychological theories and data relevant to the analysis of illness and disease; decision making and medical problem solving. *Prerequisite:* Twelve hours of psychology and a 3.0 GPA; and senior, graduate, or professional standing; or consent of instructor. 3 hours or 1 unit.

302. Introduction to Clinical Neuropsychology

Fundamental concepts of clinical neuropsychology will be introduced, and students will learn the neuropsychological measures that are typically employed in assessment. The course will take a developmental perspective, and readings will address assessment issues in children and adolescents as well as adults. The course will be conducted as a lecture/seminar, with a focus on class participation. Actual testing data will be distributed to the class, and discussion will focus on interpretation and case conceptualization. Students will also be required to learn about and administer tests. *Prerequisite:* PSYCH 315 or 304. 4 hours or 1 unit.

303. Memory and Amnesia

Same as NEURO 323. Examination of the nature of amnesia and what it teaches us about the organization of normal human memory. Coverage will include studies of amnesia and other circumscribed memory impairments in human patients, and other neuroscientific and cognitive explorations of memory prompted by the phenomena of amnesia. *Prerequisite:* PSYCH 210 and/or PSYCH 224, or consent of instructor. 3 hours or 1 unit.

304. Cognitive Neuroscience

Same as NEURO 304. Examination of research concerned with identifying and characterizing the cognitive systems supporting such capacities as memory, attention, and visual processing, and with understanding how such cognitive activities arise from the functioning of specific brain modules and brain mechanisms. *Prerequisite:* PSYCH 210 and/or PSYCH 224, or consent of instructor. 3 hours or 1 unit.

306. Statistical Methods, I

Techniques in applied statistics used in psychological research, including simple linear regression, partial and multiple correlation, and nonparametric methods; thorough review of statistical estimation and significance tests; emphasizes applied statistics and statistical computing. Introduces experimental design; one-way ANOVA. *Prerequisite:* Twelve hours in psychology and PSYCH 235, or equivalent. 4 hours or 1 unit. Students may not receive credit for both PSYCH 306 and SOC 386.

307. Statistical Methods, II

Experimental design, including Latin Squares, factorials, and nested designs; expected mean squares, analysis of covariance; emphasizes the general linear model; introduces multivariate methods, such as factor analysis, scaling, classification, and clustering. Discrete multivariate analysis-multiway contingency tables. *Prerequisite:* PSYCH 306. 4 hours or 1 unit. Students may not receive credit for both PSYCH 307 and SOC 387.

310. Hate Crimes: Perspectives on Intergroup Aggression and Violence

Same as AFRO 310. See AFRO 310.

311. Laboratory in Physiological Psychology

Same as NEURO 311. Research on classical and current problems; emphasis on the nervous and endocrine systems in information processing and in the regulation of behavioral adaptation; and examples from sensation, perception, motivation, emotion, and learning. Laboratory. *Prerequisite:* PSYCH 211 and consent of instructor. 4 hours, or ½ or 1 unit.

312. Neurobiology of Vision

Same as NEURO 324. Topics include physiological optics, the retina, cerebral cortex, effects of early visual experience on eye and brain development, and neural control of eye movements. Emphasis will be on aspects of vision for which direct links can be drawn between psychology and neurobiology, such as color vision, motion perceptions, and depth perception. *Prerequisite:* PSYCH 210, or an introductory course in neurobiology, or consent of instructor. Students should have knowledge of the overall structure of the brain and how neurons communicate. 3 hours or ¾ unit.

313. Psychopharmacology

Same as NEURO 313. Behavioral and physiological effects of chemicals either used therapeutically to treat psychological disorders or that may be abused for their psychotropic effects; emphasizes mechanisms and models for the study of drug action. *Prerequisite:* PSYCH 210, EEE 353, or BIOL 303; or consent of instructor. 3 hours, or ¾ or 1 unit.

314. Brain, Learning, and Memory

Same as NEURO 314. Conveys a knowledge of current research on the physiological bases of learning and memory; considers a wide range of topics from molecular (e.g., cellular morphological and functional plasticity) to relatively molar (e.g., effects of clinical and experimental brain damage on learning and memory processes). *Prerequisite:* PSYCH 210 or BIOL 303; or PSYCH 248 or 348; or consent of instructor. 3 hours or 1 unit.

315. Human Neuropsychology

Same as NEURO 325. Surveys how the neurological substrate of the human brain governs and influences cognition; biological bases of language, memory, spatial processing, and emotion; principles of brain organization, localization of function and individual differences; includes developmental and clinical issues. *Prerequisite:* PSYCH 210 or equivalent. 3 hours, or ½ or 1 unit.

316. Introduction to the Psychology of Hearing

Examines the physiology and psychophysics of hearing from the micromechanics of the cochlea to the localization of sound and the acoustics of concert halls, to understand how the auditory system processes information to create perceptions of acoustic events. *Prerequisite:* PSYCH 210 or BIOL 303. 3 hours, or ½ to 1 unit.

318. Psychology of the Infant

Early infant behavior, emphasizing critical evaluation of the various research techniques; prenatal and perinatal influences, ontogeny of psychological processes, environmental determinants, and infant assessment. *Prerequisite:* PSYCH 216. 3 hours or 1 unit.

320. Principles of Psychophysiology

Same as NEURO 320. Theoretical and practical aspects of human psychophysiology; measurement techniques and the application of psychophysiological principles to problems in developmental, clinical, social, and experimental psychology. *Prerequisite:* PSYCH 234 or 235, six hours of psychology, and an introductory course in physiology. 3 hours or 1 unit.

321. Human Memory

Advanced treatment of human memory. Examines basic theory and methodology; types of memory; semantic, episodic, procedural, memory for language, places, and events; knowledge and memory; autobiographical memory; exceptional memory; mnemonics. *Prerequisite:* Six hours in psychology at or above 200 level, such as PSYCH 224 or 248. 3 hours or 1 unit.

322. Introduction to Mental Retardation

Same as REHAB, SOC W, and SP ED 322. See SP ED 322.

323. Language Acquisition

Same as LING and COMM 323. Survey of theory and research on the acquisition of language, concentrating on the acquisition of a first language by the young child. *Prerequisite:* Six hours of psychology or linguistics above the 100-level, or consent of instructor. 3 hours or 1 unit.

324. Psychology of Thinking

Survey of problems, experimental methods, and research findings in human thinking; emphasis on concept formation, problem solving and decision making, and creativity. *Prerequisite:* PSYCH 235. 3 hours or 1 unit.

325. Psychology of Language

Survey of theory and research in the psychology of language; topics include relation of linguistics and psychology, language development, and influence of language on perception,

memory, and thought. *Prerequisite:* Six hours of psychology or consent of instructor. 3 hours or 1 unit. Credit not given for both PSYCH 325 and LING 325.

327. Language and the Brain

Same as LING 327. How the human brain supports using and learning language. Topics covered: measuring brain activity during language; brain lateralization for language; the effect of brain damage; language learning and language universals; communication and language in other animals; evolution of language. *Prerequisite:* One of PSYCH 210, 224, 248 or consent of instructor. 3 hours or 1 unit.

329. Human-Computer Interaction Laboratory

Same as AVI 329 and I E 349. Examines basic concepts, methodology, and critical skills needed in conducting research, evaluating and designing human-computer interfaces. Laboratory includes performing experiments in human-computer interaction. *Prerequisite:* PSYCH 224, 258, or 356; and a course in computer science; or consent of instructor. 4 hours or 1 unit.

331. Laboratory in Cognitive Psychology

Examination of the methods used to study human thought processes, including attention, memory, decision-making, language and concepts. Students will learn to design, carry out, and report research in cognitive psychology. *Prerequisite:* PSYCH 224 or 248; and PSYCH 235. 4 hours or 1 unit.

332. Research Methods in Social Psychology: Laboratory Methods

Same as SOC 332. Lecture and laboratory in the methods and techniques of social psychological research in laboratory settings. *Prerequisite:* PSYCH 201 or SOC 201; PSYCH 235 or SOC 185. 4 hours, or ½ or 1 unit.

333. Research Methods in Social Psychology: Natural Settings

Methods and techniques of social psychological research in natural settings. Students formulate and carry out research problems using procedures appropriate for research in natural settings. *Prerequisite:* PSYCH 201 or SOC 201; PSYCH 235, or SOC 185. 4 hours or 1 unit.

335. Mathematical Formulations in Psychological Theory

Illustration of mathematical formulations by studying quantitative treatments of various psychological processes; emphasis on learning theory, psychophysical laws, and other selected topics; and the development of simple mathematical tools as required. *Prerequisite:* Elementary statistics of probability, elementary calculus, and 6 hours of psychology, or consent of instructor. 3 hours, or ½ or 1 unit.

336. Topics in Clinical/Community Psychology

Survey and critical review of subdisciplines in clinical/community psychology; concepts, methods, and assessments, intervention strategies and tactics. Subdisciplines addressed will vary. See *Timetable* for current titles. *Prerequisite:* PSYCH 238 or 239 or both depend-

ing on topic; consult *Timetable*. 3 hours, or ½ or 1 unit. May be repeated in same semester to a maximum of 6 hours or 2 units. May be repeated in subsequent semesters to a maximum of 9 hours or 3 units. Repeated registrations must be approved by instructor(s) or the department.

337. Behavior Modification

Introduction to the principles and application of behavior modification; includes methods of behavioral assessment, positive and negative reinforcement, punishment and extinction, token economics, programmed instruction, and desensitization; and emphasizes establishing behavioral objectives in the modification of child and adult clinical problems. *Prerequisite:* PSYCH 248. 3 hours or 1 unit.

338. Psychology of Women

Same as W S 338. Topics will include recent research and theory on women's social, personality, and cognitive development across the life span; achievement motivation and career development; the integration of work and family; sexuality, partnering, and maternity; sexual victimization; gender and psychological adjustment; and selected topics in psychotherapy for women. *Prerequisite:* PSYCH 240. 3 hours or 1 unit.

340. Community Projects

Principles of psychology applied to service problems in the community; students serve as nonprofessional mental health workers in supervised experiences in schools, hospitals, and other nontraditional settings. *Prerequisite:* PSYCH 100 and 239; junior or senior standing; and consent of instructor. 4 hours or 1 unit.

341. Advanced Community Projects

Advanced discussion and practicum on principles of psychology which may supplement mental health and other human services in a community. Students serve as nonprofessional mental health workers in supervised experiences in school hospitals and other nontraditional settings. *Prerequisite:* PSYCH 340 and consent of instructor. 4 hours or 1 unit.

342. Behavior-Genetic Analysis

Same as ANTH 342 and EEE 350. Concepts, methods, and problems in the analysis of relations between genetic systems and behavior, including a historical and analytical examination of the scientific foundations of racism. *Prerequisite:* ANTH 240 or BIOL 106, 123 or 210. 3 hours or ¾ unit.

343. Hormones and Behavior

Same as EEE 353 and NEURO 343. Survey of the behavioral effects of hormones in vertebrates and invertebrates; emphasizes the extensive literature on hormonal effects on reproductive and social behavior. *Prerequisite:* BIOL 121 or equivalent. 3 hours, or ¾ or 1 unit. Students enrolled for graduate credit may write a term paper for an extra ¼ unit credit.

346. Psychophysiology in Exercise and Sport

Same as KINES 343. See KINES 343.

349. Social Psychology of Sport

Same as KINES 347. See KINES 347.

350. Laboratory in Personality

Study of personality emphasizing active participation in designing, conducting, analyzing, and presenting of research; lectures concern the practical aspects of research methodology and the philosophy of personality research; and laboratory involves conducting original research in small groups. *Prerequisite:* PSYCH 235 or equivalent; and PSYCH 250 or consent of instructor; completion of campus Composition I general education requirement (applies to writing-intensive sections taken for Composition II credit). 4 hours or 1 unit.

352. Attitude Theory and Change

Same as COMM and SOC 352. Comprehensive analysis of theories of attitude acquisition, organization, and change; emphasis on attitude change through communication and effects of persuasive communication on public opinion. *Prerequisite:* PSYCH 201 or SOC 201, or a comparable course of introduction to social psychology. 3 hours, or ½ or 1 unit.

353. Social Cognition

Analysis of theory and research on problems related to the manner in which persons judge themselves and others on the basis of information received; topics include impression formation integration, determinants of interpersonal attractions, and attribution processes. *Prerequisite:* PSYCH 201 and 235, or graduate standing, or consent of instructor. 3 hours or 1 unit.

354. Small Group Behavior

The nature of interpersonal transactions; theories and methods for their investigation; and consideration of both individual and social determinants of such transactions. *Prerequisite:* PSYCH 201. 3 hours, or ½ or 1 unit.

355. Industrial Social Psychology

Same as L I R 355. Social psychological research and theory applied to industrial problems; emphasis on interaction and communication theory, role theory, leadership theory, motivational and perceptual theory, and group structure theory as an aid in understanding and analyzing industrial problems. *Prerequisite:* PSYCH 201 or 357. 3 hours, or ½ or 1 unit.

356. Human Performance and Engineering Psychology

Same as AVI 356 and I E 346. Human capabilities and limitations in processing information; models and theories of signal detection, stimulus analysis, short-term memory, choice reaction time, decision-making, attention, and motor performance are evaluated with respect to experimental data; emphasizes theory, although implications for design of man-machine systems are considered. *Prerequisite:* PSYCH 100 or 103 or consent of instructor. 3 hours or 1 unit.

357. Psychology of Industrial Relations

Same as L I R 357. An analysis, in terms of the behavior of individuals, of the causes and possible solutions of industrial conflict. Offered in the special interest of industrial relations, commerce, and engineering students. *Prerequisite:* PSYCH 100 or equivalent. 3 hours, or ½ or 1 unit.

359. The Social Psychology of Organization

Same as SOC 359. Analysis of the interrelationships between social and psychological factors, and organizational structure and process; emphasis on sources, consequences, and modes of resolution of intraindividual, intraorganizational, and interorganizational conflict. *Prerequisite:* PSYCH 201. 3 hours or 1 unit.

360. Modern Viewpoints in Psychology

Examines modern behaviorism, psychoanalysis, and cognitive psychology, viewed as conceptions of man, styles of theorizing and investigative strategies; critically evaluates the more influential theories and research. *Prerequisite:* Six hours of psychology. 3 hours, or ½ or 1 unit.

362. Cognitive Development

Survey of theory and research on the development of problem-solving skills, memorial and metamemorial processes, logical thinking, and language. *Prerequisite:* PSYCH 216 and 235. 3 hours or 1 unit.

363. Laboratory in Developmental Psychology

Experience in designing, carrying out, and reporting an original research project. *Prerequisite:* PSYCH 216 and 235, or equivalent. 4 hours or 1 unit.

365. Personality and Social Development

Same as EDPSY 315. Major theories of personality and social development, with attention to processes of social learning, individual differences in personality development, and outcomes of social development; applications to school, home, and other field settings. *Prerequisite:* PSYCH 216 or EDPSY 236, or equivalent. 3 hours or 1 unit.

367. Introduction to Counseling and Psychotherapy

Same as EDPSY 360. See EDPSY 360.

368. Psychology and Law: Civil Liberties and Constitutional Issues in the Mental Health, Educational, and Criminal Justice Systems

Examines relationship of the administrative, civil, and criminal justice systems to educational and mental health institutions; individual rights, social issues, and psychological well being. *Prerequisite:* Six hours of social science. 3 hours, or ½ to 1 unit.

372. Environmental Psychology

Same as NRES 370. See NRES 370.

373. Theory and Method in the Cross-Cultural Study of Individual Social Behavior

Same as ANTH 373. Centers on cross-cultural study of substantive areas such as personality, motivation, socialization, interpersonal behavior, psychological environments, cognition and cognitive development, ethnocentrism and stereotypes, and visual perception; emphasis on methodological limitations and contributions of cross-cultural study; and discussion of current problems and research. *Prerequisite:* Six hours of psychology or anthro-

pology, or consent of instructor. 3 hours or 1 unit.

375. Personnel Psychology

Introduces problems and research relevant to personnel issues in organizations. Topics include: individual differences; selection of personnel; test theory; performance appraisal; equal employment opportunity legislation, regulation, and litigation; assessing bias in selection. *Prerequisite:* PSYCH 235 or equivalent, and either PSYCH 245 or B ADM 351. 3 hours, or ¾ or 1 unit.

377. Philosophy of Psychology

Same as PHIL 377. See PHIL 377.

381. Beginning Practicum in Mental Health

Didactic instruction and supervised practicum experience in a community treatment agency; self-report, observational, and physiological approaches to client assessment; and lecture-discussion and direct agency experience each week. 4 hours or 1 unit.

383. Advanced Practicum in Mental Health, I

Supervised practicum experiences in a community agency. 4 hours or 1 unit.

385. Advanced Practicum in Mental Health, II

Supervised practicum experiences in a community agency. 4 hours or 1 unit.

390. Laboratory in Psychological Measurement and Test Development

The measurement of human behavior in psychological studies; the construction and use of psychological tests; introduction to tests of intelligence, achievement, personality, and interest; and practice in test construction, administration, and validation. Lectures and laboratory. *Prerequisite:* A knowledge of statistics equivalent to that from PSYCH 235. 4 hours or 1 unit.

396. Seminar in Psychology

Special topics in the field of psychology. *Prerequisite:* Junior standing and consent of instructor. 2 to 4 hours, or ½ to 1 unit. May be repeated to a maximum of 12 hours or 3 units.

398. Human Factors in the Design of Complex Systems

Same as I E 348. See I E 348.

Note: The prerequisites stated below apply to graduate majors in psychology. Graduate students minoring in psychology may, by special permission of instructors, enroll in certain of these courses without having met all the prerequisites.

402. Systematic Psychology

Analysis of methodological problems, including forms and roles of models and theories, status of unobservable organismic events, validation of measures and manipulations, possible forms of laws, forms of data language, and status of private reports; evaluation of the approaches to these problems provided by several varieties of behaviorism, standard and omnitheoretic views in the philosophy of science, and network methods.

Prerequisite: Twelve hours of psychology. 1 unit.

403. Categories and Concepts

The psychology of human concepts, including concept learning, categorization, the structure of concepts in memory and conceptual development. *Prerequisite:* Graduate standing in psychology or consent of the instructor. 1 unit.

404. Theories of Attention

Systematic study of the psychology of attention, including focused and divided attention, dual-task performance, attention and memory, attention and automatization, and skilled performance. The emphasis is primarily theoretical, focusing on current approaches and the historical developments that led to them. *Prerequisite:* Graduate standing in psychology or consent of instructor. ½ or 1 unit.

405. Neurochemistry

Same as NEURO and PHYSL 405. The fundamentals of neurochemistry and topics of current interest; detailed study of chemical transmission, including metabolism, neuroanatomical distribution, pharmacology, and functions of neurotransmitters. Lecture-seminar. *Prerequisite:* BIOCH 350, PSYCH 210, or consent of instructor. ¾ unit.

406. Psychological Scaling: Unidimensional Methods

Same as SOC 406. Measurement of psychological values; centrally concerned with how subjective values of multiple physical dimensions combine to produce unidimensional subjective values; and includes conjoint and functional measurement theory and methods, theoretical models of judgment and the analysis of empirical structures, and applications of scaling models to problems in social, personality, perception, and cognitive psychology. *Prerequisite:* PSYCH 307, SOC 387, or equivalent course in quantitative methods. 1 unit.

409. Psychological Scaling: Multidimensional Methods

Same as SOC 409. Basic scaling theory; metric, nonmetric, and individual differences multidimensional scaling models and methodology, emphasizing underlying assumptions and interpretation; and applications of scaling methods to measurement problems in social and personality psychology, perception, cognition, and sociology. *Prerequisite:* PSYCH 307, SOC 387, or equivalent course in quantitative methods. 1 unit. PSYCH 406 is recommended but not required.

410. Advances in Psychobiology: Introduction for Graduate Students

Same as NEURO 410. Deals with the relevance of biological psychology to the subdisciplines of psychology; topics include current theory and treatment of psychosis, neuropsychology of movement disorders, human memory models and the brain, hormones and sexuality, biorhythms in normal and abnormal behavior, physiology of sensing and perceiving, selective attention, and others. *Prerequisite:* PSYCH 210 or consent of instructor. ½ to 1 unit. Consent of instructor is required for more than ½ unit.

411. Advanced Physiological Psychology

Same as NEURO 411. Detailed examination of the physiological mechanisms in behavior; emphasis on research methodology and contemporary literature in the physiology of motivation, learning, perception, and emotion; and includes laboratory demonstrations and problems. *Prerequisite:* Twelve hours of psychology, including PSYCH 311 or equivalent. ½ or 1 unit.

414. Neurotoxicology

Same as ENVST and V B 414. See V B 414.

416. Perception

Systematic study of methods and research findings in the field of human perception, together with an evaluation of theoretical interpretations. *Prerequisite:* Twelve hours of psychology. 1 unit.

418. Experimental Psychology of Learning, II: Human Learning

Data and theories of verbal learning; verbal mediators and their functions in learning and retention; transfer of training; short-term and long-term memory; and conceptualizations of the forgetting process. *Prerequisite:* Twelve hours of psychology or consent of instructor. 1 unit.

421. Knowledge Representation

Surveys theories and data about the representation of knowledge by human beings; examines images, concepts, semantic features, propositions, semantic nets, rules, parallel distributed, procedural, schemas, mental models, and theories. *Prerequisite:* Background in either cognitive psychology, linguistics, or artificial intelligence. 1 unit.

422. Models of Human Memory

Detailed examination and comparison of human memory models. Emphasis on understanding the central aspects of 5-8 recent models and their similarities and differences. *Prerequisite:* PSYCH 224, 324, and 418, or consent of instructor. 1 unit.

423. Problem Solving and Cognitive Skill Acquisition

Selected topics in how people solve problems and learn cognitive skills. A broad range of empirical findings will be discussed, along with psychological and computational accounts. *Prerequisite:* PSYCH 324 or consent of instructor. 1 unit.

424. Developmental Psycholinguistics

Same as COMM and LING 424. Examination of empirical and theoretical literature on the acquisition of language; emphasis on universal patterns in the acquisition of a first language and on a consideration of explanations, both psychological and linguistic, for these patterns. *Prerequisite:* LING 325, PSYCH 325 or 362, or consent of instructor. ½ or 1 unit.

425. Psycholinguistics

Same as COMM and LING 425. Critical survey of methods and theories in the psychological study of the communication process; emphasis on linguistic, information-theory, and learning-theory approaches; psycholinguistic analysis of language decoding and encoding; and the development and measurement of

symbolic processes, including meaning. *Prerequisite:* Consent of instructor. ½ or 1 unit.

426. Psychology of Reading

Same as EDPsy 416. See EDPsy 416.

427. Engineering Psychology

Same as AVI 427. Experimental psychology applied to the study of man-machine systems; considers research issues, methodological matters, and principles of design and training in terms of contemporary aircraft, highway, industrial, and health-care systems. *Prerequisite:* PSYCH 258 or 356, or consent of instructor. 1 unit.

428. Cognitive Determinants of Behavior

Theoretical and experimental analyses of the role of decision processes and causal attributions in the control of behavior; examines a variety of subparadigms from several areas of psychology. *Prerequisite:* Twelve hours of psychology. 1 unit.

429. Second Language Acquisition and Bilingualism

Same as LING 429. See LING 429.

430. Foundations of Industrial-Organizational Psychology

Same as L I R 430. Theoretical and empirical foundations of various content areas in industrial-organizational psychology; sample topics include employee selection and placement, training, human factors engineering, work motivation, employee attitudes, leadership, and organizational theory. *Prerequisite:* Twelve hours of psychology or consent of instructor. 1 unit.

431. Psychological Measurement in Industry

Application of psychometric methods and the finding of differential psychology to the selection, classification, and performance evaluation of industrial personnel. *Prerequisite:* PSYCH 307 or equivalent. 1 unit.

432. Introduction to Clinical Psychology Practicum

Supervised practice in mental health delivery services; includes assessment and modification of problem behaviors in short-term treatment programs and beginning experience in school and community consultation; and emphasizes the development of skills in interviewing, conceptualization of problem behaviors, report writing, and effective staff interactions. *Prerequisite:* First-year graduate standing in clinical psychology and credit or concurrent registration in PSYCH 438. 1 unit.

433. Internship in Industrial/Organization Psychology

Supervised practice in organizational practice and research, implementation of programs, evaluation, feedback of survey results, applied assessments, assistance in EAP programs, and development of personnel guidelines; emphasizes applications of principles and procedures. Offered in special interest of graduate students in I/O psychology program. *Prerequisite:* Graduate standing in Psychology, credit or concurrent registration in PSYCH 430, and consent of instructor. 1 unit.

434. Models of Decision and Choice

Same as ACCY 495. Survey of mathematical and other formal models of human judgment and decision processes. Emphasizes differences between normative and descriptive models. *Prerequisite:* PSYCH 307. 1 unit.

435. Motivation and Morale in Industry

Same as L I R 435. Concepts and methods in the study of motivation of employees; determinants of employee attitudes and job satisfaction; and modification of attitudes and morale. *Prerequisite:* Four units of graduate credit in psychology or consent of instructor. 1 unit.

438. Introduction to Clinical Psychology, I

Introduction to clinical psychology as a science and profession. Considers psychodynamic, behavioral, and community perspectives; emphasizes the conceptual foundations of each approach. Required of all entering graduate students in clinical psychology. *Prerequisite:* Consent of instructor required for all students not admitted to graduate program in clinical psychology. 1 unit.

439. Introduction to Clinical Psychology, II

Considers critical issues in the assessment and study of psychological and social dysfunction, as manifested in adult psychopathology, childhood disorders, and community problems. Required of all entering graduate students in clinical psychology. *Prerequisite:* Credit or concurrent registration in PSYCH 438; consent of instructor required for students not admitted to graduate program in clinical psychology. 1 unit.

440. Social Development

Same as EDPsy 440. See EDPsy 440.

441. Personality and Behavior Dynamics

Theory and research in personality, emphasizing personality as individual differences among persons and personality as attributed to persons by others; explores the measurement, antecedents, and consequences of such differences and attributions. *Prerequisite:* Twelve hours of psychology. ½ or 1 unit. Graduate credit is not allowed for both PSYCH 350 and 441.

442. Skill, Expertise, and Mental Models in Complex Systems

Same as I E 442. See I E 442.

445. Strategies of Clinical Intervention

Critical survey of issues, principles, practice, and research related to modifying human behavior; covers psychotherapeutic and somatic approaches; symptomatic relief and personality-restructuring; goal-orientations; and individual family, group, milieu, and preventive community intervention. *Prerequisite:* Concurrent registration in PSYCH 447 strongly recommended. 1 unit.

446. Laboratories in Clinical Psychology

Intensive practice in techniques of clinical assessment and behavior modification with emphasis on recent innovations; small sections of the course formed according to the specialized interests of students and staff. *Prerequisite:* PSYCH 432 and 445, or consent of instructor. ½ to 1 unit.

447. Internship

Supervised field experience in clinical psychology. *Prerequisite:* Consent of instructor. 0 to 4 units.

450. Community Psychology and Social System Change

Intensive examination of the historical antecedents, conceptual models, strategic tactics, and evaluation methods of planned social and ecological change; focuses on the role of the community psychologist in such endeavors; and reviews interventions in several social systems, such as criminal justice education, employment, and mental health. *Prerequisite:* PSYCH 239 or equivalent; graduate standing in psychology or consent of instructor. ½ or 1 unit.

451. Theory and Method in Social Psychology, I

First of two-course sequence for first-year graduate students in social psychology. Advanced theoretical and research approaches to a broad range of issues in social psychology; participation and seminar presentations by social psychology program faculty. Student participates in seminar presentations and develops and conducts a research study in conjunction with one or more faculty members. *Prerequisite:* Consent of instructor. 1 unit.

452. Theory and Method in Social Psychology, II

Second of a two-course sequence for first-year graduate students in social psychology. Advanced theoretical and research approaches to a broad range of issues in social psychology; participation and seminar presentations by social psychology program faculty. Each student participates in seminar presentations and develops and conducts a research study in conjunction with one or more faculty members. *Prerequisite:* Consent of instructor. 1 unit.

453. Individual Behavior in Organizations

Same as B ADM 410, POLS 460, and SOC 456. See B ADM 410.

457. Theory and Research in Organizational Psychology

Theory and research on the psychological processes involving the demands of organizations on the behavior of individuals; emphasis on the processes of power, authority, influence, leadership, communications, decision making, and organizational change. *Prerequisite:* Consent of instructor. 1 unit.

458. Advanced Problems in Attitude Research

Intensive analyses of recent developments in attitude theory and research; emphasis on the attitude-behavior relationship; and examination of theories of attitude and attitude change with respect to their utility in predicting and changing social behavior. *Prerequisite:* Consent of instructor. 1 unit.

459. Advanced Problems in Research on Groups

Intensive examination of current research and theory on structure, process, and performance of groups; critical examination of recent research and theoretical literature; and development of research designs for related

issues in the field. *Prerequisite:* Consent of instructor. 1 unit.

460. Motivation and Personality Development in Children

Theory, method, and research on the interaction of motivational, personality, and learning processes and development in children; emphasis on experimental studies and a social learning theory approach. Class projects involve some laboratory work with children. *Prerequisite:* Twelve hours of psychology; consent of instructor. 1 unit.

463. Research Methods in Clinical Psychology and Personality

The logical analysis of clinical inferences and their role in research; problems and methods in the investigation of the development, dynamics, and structure of personality; and research in psychotherapy. *Prerequisite:* PSYCH 306. 1 unit.

464. Advanced Problems in the Study of Individual Social Behavior

Intensive examination of current research into one or more of the following areas: social perception and cognition, social motivation, social learning, and environmental factors in social behavior; critical examination of recent research and theoretical literature, and development of research designs for selected current issues. *Prerequisite:* Consent of instructor. 1 unit.

467. Personality Assessment

Methods and theory in the quantitative assessment of personality; review of research findings and trends. *Prerequisite:* PSYCH 307 or equivalent. 1 unit.

469. Cognitive Development

Examination of laboratory investigations of cognitive development in children; emphasis on current theories of cognition and language; and class projects involving some laboratory work with children. *Prerequisite:* Twelve hours of psychology; consent of instructor. 1 unit.

470. Principles and Methods of Teaching Psychology

Designed for graduate students in psychology; areas considered include developing course objectives and content; developing and presenting teaching-learning situations; evaluating the attainment of course objectives; advising and counseling students; ethics in teaching; and research problems on the teaching of psychology. *Prerequisite:* Second-year graduate standing in psychology or consent of instructor. 0 to 1 unit.

471. Proseminar in Cognitive Science

Same as ANTH and LING 470, C S 449 and EDPSY 471. See ANTH 470.

472. The Methodology of Eye Movements in the Study of Cognition

Same as EDPSY 470. See EDPSY 470.

483. Psychology of Speech and Hearing Disorders, I

Same as SPSHS 483. See SPSHS 483.

485. The Sampling of Human Populations and Social Organizations

Same as B ADM 435 and SOC 485. See B ADM 435.

486. Multivariate Correlational Techniques in Educational Research

Same as EDPSY 485. See EDPSY 485.

488. Covariance Structure and Factor Models

Same as EDPSY, SOC, and STAT 488. Introduction to covariance structure models, linear structural equations, and factor analysis; identification and parameter estimation problems; assessing goodness-of-fit; use of computer packages LISTREL and EQS; applications to a wide variety of social and behavioral science modeling problems. *Prerequisite:* PSYCH 494, STAT 471, or SOC 387. 1 unit.

490. Individual Research

For graduate students who wish to conduct research on special problems not included in graduate theses. *Prerequisite:* Consent of instructor. 0 to 4 units.

492. Psychology of Learning and Instruction

Same as EDPSY 492. See EDPSY 492.

493. Seminar

Discussion of current topics in their historical setting, with special emphasis on research problems. *Prerequisite:* Consent of instructor. 0 to 1 unit.

494. Multivariate Analysis in Psychology and Education

Same as EDPSY and SOC 494. Examines the principal methods of descriptive and inferential statistics used in the analysis of multiple measurements, emphasizing linear transformations, multiple regression, principal components, multivariate analysis of variance, canonical correlation and variates, discriminant functions and variates, and conventional procedures of factor analysis; involves both theory and applications. *Prerequisite:* PSYCH 307 or EDPSY 496; consent of instructor. 1 unit.

495. Theories of Measurement

Same as EDPSY 495. See EDPSY 495.

499. Thesis Research

0 to 4 units.

PUBLIC HEALTH NURSING

(See Nursing)

REHABILITATION COUNSELING

(See Community Health)

RELIGIOUS STUDIES

Director of Program: Wayne T. Pitard
Program Office: 3080 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 333-0473
URL: www.lang.uiuc.edu/RelSt/Program/Home.html

Religious Studies (RELST)

101. The Bible as Literature

Same as ENGL 114. Themes and literary genres in the Bible, emphasizing content important in Western culture. 3 hours.

104. Asian Mythology

Same as ASST 104. Introductory survey of the mythologies of India, China, and Japan. 3 hours.

106. Archaeology and the Bible

Examination of archaeological evidence, especially from Syria-Palestine, and discussion of its use in the interpretation of Biblical literature. 3 hours.

108. The Sacred Mind: Religion and Society in Western Thought from Antiquity to the Enlightenment

Same as ANTH, PHIL, and SOC 108. Introduction to classic writers and texts in Western religious and social thought from antiquity to the Enlightenment, with emphasis on their social and historical contexts. 3 hours.

109. The Secular Mind: Religion and Society in Western Thought from the Enlightenment to the Present

Same as ANTH, PHIL, and SOC 109. Introduction to classic writers and texts in Western religious and social thought from the En-

lightenment to the present, with emphasis on their social and historical contexts. 3 hours.

110. World Religions

Same as PHIL 110. Survey of the leading living religions, including Hinduism, Buddhism, Confucianism, Taoism, Judaism, Christianity, and Islam; examination of basic texts and of philosophic theological elaborations of each religion. 3 hours.

111. Elementary Greek, I

Same as GRK 101. See GRK 101.

112. Elementary Greek, II

Same as GRK 102. See GRK 102.

120. A History of Judaism

Same as HIST 120. Examines the social, political, economic, and intellectual history of the Jews from Abraham to the present-day, with particular attention to Jewish thought and society. 3 hours.

121. Christianity: An Introduction

Typological and historical approaches to major forms of Christianity: Eastern Orthodoxy, Catholicism, and Protestantism. 3 hours.

122. History of East Asian Religions

Same as EALC 122. Introduction to East Asian religious traditions; emphasizes the ideas of Confucianism, Taoism, and Buddhism in China and their historical interactions. 3 hours.

123. COMP II/Islam: An Introduction

History of Islamic thought from the time of Muhammad to the present, including the prophet hood of Muhammad, the Qur'an, theology and law, mysticism and philosophy, sectarian movements, modernism and legal reform, and contemporary resurgence. 4 hours.

124. Islam: An Introduction

History of Islamic thought from the time of Muhammad to the present, including the prophet hood of Muhammad, the Qur'an, theology and law, mysticism and philosophy, sectarian movements, modernism and legal reform, and contemporary resurgence. 3 hours.

130. Jewish Practices: A Religio-historical Approach

The major festivals and life-cycle rituals of Judaism; focuses on sacred time, interaction of external and internal factors producing change and conservatism, relationship of ritual and theology, and the thematic development inherent in the rituals. 3 hours.

131. Jewish Storytelling: From the Russian Shtetl to New York

Same as ENGL 123 and YDSH 120. See YDSH 120.

132. Zen

Same as EALC 132. Introduces the history, teachings, and practice of Zen Buddhism in China and Japan. 3 hours.

160. Ancient Greek and Roman Religion

Same as CLCIV 160. See CLCIV 160.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors

or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Classical and Koine Greek Prose

Same as GRK 201. See GRK 201.

201. Hebrew Bible in English

Analyzes the critical issues in the interpretation of the literature of the Hebrew Bible/Old Testament; surveys the history and religion of Ancient Israel with special reference to Israel's setting in the ancient Near East. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

202. New Testament in English

Analyzes the literature of the New Testament in its social and religious setting, with special reference to the ministry and teaching of Jesus, the emergence of the church as a sect within ancient Judaism, and the development of Christian institutions in the Graeco-Roman world. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours.

204. Classical and Koine Greek Prose, II

Same as GRK 202. See GRK 202.

205. Introduction to Classical Hebrew, I

Same as HEBR 205. See HEBR 205.

220. Jewish Literary Responses to the Holocaust

Same as ENGL 288 and YDSH 220. See YDSH 220.

221. American Judaism

Forms of Judaism in America: Reform, Conservative, Reconstructionist, Orthodox, and Hasidic Judaism; the American rabbi; Zionism in America; American Jewish communal life; national Jewish organizations; the American synagogue; and the secular Jew. *Prerequisite:* completion of campus Composition I general education requirement. 3 hours.

223. The Qur'an (Koran) and Its Interpreters

Introduction to the Qur'an (Koran), the holy scripture of Islam, examining its major doctrines, thematic development, literary style, and its relationship to pre-Qur'anic, especially Biblical, traditions. Special attention is given to various methods Muslims have used to interpret the Qur'an. *Prerequisite:* RELST 123 or 124. 3 hours. Students may not receive credit for both RELST 223 and 103.

224. Chinese Thought from Confucius to Mao

Same as EALC and HIST 224. See HIST 224.

225. Gods and Man in Modern Japanese Drama

Same as EALC and C LIT 225. See EALC 225.

229. Religion and Society

Same as SOC 229. See SOC 229.

230. Philosophy of Religion: Introduction

Same as PHIL 230. See PHIL 230.

232. Ancient Greek Sanctuaries

Same as ARTHI 218 and CLCIV 232. See CLCIV 232.

242. The Holocaust: Religious Responses

The theoretical foundation for ideas of national and racial superiority which attended the holocaust and responses to this phenomenon by major Jewish and Christian thinkers, including Rubenstein, Buber, Fackenheim, Berkowitz, Reuther, and Wiesel. 3 hours.

251. Viking Mythology

Same as SCAN 251. See SCAN 251.

260. Mystics and Saints in Islam

Examines mystical concepts and practices in Islam through the ages, through the lives and writings of important mystics and Sufi holy men and women, as well as the integration of mysticism and the Sufi Orders into Muslim society and Islamic orthodoxy. 3 hours. No knowledge of Islam or foreign language is required.

268. Religious Rebellions and Messianic Movements in History

Same as HIST 268. See HIST 268.

269. Spirituality and Experience in the Arts of the Middle Ages

Same as ARTHI and HIST 269. See ARTHI 269. (Counts for advanced hours in L A S.)

282. Muslims and Christians: Interactions and Reactions

Explores the complexity of Muslim-Christian interactions since early Islam, including theological and philosophical exchanges, debates, polemics, interfaith dialogue, perceptions of each other, Muslim minorities in the West, and Christian minorities in the Muslim world, and the relationship of religion to culture. 3 hours.

283. Jewish Sacred Literature

Same as C LIT and ENGL 283. Literary study of the major post-biblical sacred texts of Judaism; includes readings in translation from Mishnah, Tosefta, Talmudim, midrashim, piyyutim, and mystical treatises. Emphasizes nature, history, function, and development of literary patterns and forms and the relationships between form and content in these texts. 3 hours.

284. Modern Jewish Literature

Same as C LIT and ENGL 284. See ENGL 284.

286. Introduction to Hinduism

Elements of Hindu thought and practice; selected topics presented in historical order and in the context of Indian cultural history (including the present). 3 hours.

287. Introduction to Buddhism

Same as EALC 287. Thematic approach to the history of Buddhism from its origin in India to its spread throughout China and Japan; explores how the doctrinal and social development of Buddhism in East Asia is related to the process of cultural adaptation. 3 hours.

290. Independent Study

Special topics not treated in regularly scheduled courses; designed primarily for upper-classmen. *Prerequisite:* Evidence of adequate

preparation for such study; consent of staff member supervising the work. 2 to 6 hours. May be repeated.

293. Honors Senior Thesis

Two-semester research project. *Prerequisite:* Senior majors in religious studies who are eligible for graduating with distinction from the program. 3 hours. Must be taken for two semesters for a total of 6 hours. (Counts for advanced hours in L A S.)

294. Topics in Religious Thought

Topics in contemporary theological problems. 3 hours.

295. Topics in Asian Religions

Same as EALC 295. Topics in Hinduism, Buddhism, Taoism, and other Asian religious traditions. *Prerequisite:* Sophomore standing or consent of instructor. 3 hours. May be repeated as topics vary to a maximum of 6 hours.

296. Special Topics in the History of Judaism

3 hours. May be repeated for a maximum of 6 hours.

298. Special Topics in Biblical Interpretation

Detailed interpretation of selected books of the Bible. 3 hours. May be repeated as topics vary to a maximum of 6 hours.

301. Introductory Coptic, I

Same as COP 301 and LING 314. See COP 301.

302. Introductory Coptic, II

Same as COP 302 and LING 315. See COP 302.

303. Women in Muslim Societies

Same as ANTH, HIST, and WS 303. Examination of gender ideologies and social realities affecting the lives of women in various Muslim countries. *Prerequisite:* A course in Islam or the Middle East, or consent of instructor. 3 hours or 1 unit.

304. Medieval Civilization

Same as HIST 304. See HIST 304.

305. The Age of the Renaissance

Same as HIST 305. See HIST 305.

306. The Age of the Protestant and Catholic Reformation, 1500–1648

Same as HIST 306. See HIST 306.

308. Islam and Society in the Modern Middle East and North Africa

Same as POL S 339. Examines the role of Islam in contemporary politics, the contemporary resurgence of Islam, and the articulation of Islamic approaches to the new economic order, nationalism, and the changing role of women. *Prerequisite:* Junior standing or consent of instructor. 3 hours or ¾ unit.

312. Readings in Sanskrit, I

Same as SANSK 303. See SANSK 303.

313. Readings in Sanskrit, II

Same as SANSK 304. See SANSK 304.

329. Language of Religion

Same as LING and SPCOM 329. Introduction to the study of the language of religion; topics

include: theoretical and empirical issues related to the field, methodology for the study of language of religion, analysis of religious texts, critical evaluation of the philosophical, theological, and linguistic perspectives on the nature and function of the language of religion, and analysis of diverse forms and styles of the language of religion. 3 hours or 1 unit.

340. The Formation of Christian Thought

Study of major developments in early Christian thought (first four centuries) through discussion of primary texts in translation. *Prerequisite:* RELST 201 and 202, or consent of instructor. 3 hours, or ¾ or 1 unit.

342. History of Early Judaism

Same as HIST 300. The history of Judaism from Ezra to the rise of Islam: Hellenism and Judaism, varieties of Judaism, Palestinian Judaism and its documents, Babylonian Judaism, the rabbis, and popular Jewish culture. *Prerequisite:* Credit in one course in religious studies at the 200- or 300-level, or consent of instructor. 3 hours or ¾ unit.

343. Ancient Near Eastern Cultures

Examines the literature and religious practice of the great civilizations of the Near East, particularly the Sumerian, Assyro-Babylonian, Egyptian, Canaanite and Hittite cultures. *Prerequisite:* RELST 201 or equivalent. 3 hours or ¾ unit.

345. History of Jews in the Diaspora

Same as HIST 345. See HIST 345.

362. Philosophy of Religion

Same as PHIL 324. See PHIL 324.

363. Religion in Anthropological Perspective

Same as ANTH 363. See ANTH 363.

368. Religions of Africa

Same as ANTH 368. See ANTH 368.

381. American Intellectual and Cultural History to 1865

Same as HIST 371. See HIST 371.

382. American Intellectual and Cultural History since 1859

Same as HIST 372. See HIST 372.

384. Buddhist Meditation

Same as EALC 380. Examines classical systems of Buddhist meditation and their relation to Buddhist psychology and world view. *Prerequisite:* RELST 287, or consent of instructor. 3 hours or ¾ unit.

388. History and Thought of Chinese Buddhism

Survey of the history of Chinese Buddhism since its introduction; analysis of Buddhological trends and styles; and the sociocultural milieu of Chinese Buddhism and its place in the total history of ideas and lifestyles. *Prerequisite:* RELST 287 and 288, or consent of instructor. 3 hours, or ¾ or 1 unit.

490. Independent Study

Special topics not treated in regularly scheduled courses; for graduates. *Prerequisite:* Evi-

dence of adequate preparation for such study and consent of staff member supervising the work. 2 to 12 units. May be repeated.

RHETORIC

(See English)

ROMANCE LINGUISTICS

(See Spanish, Italian, and Portuguese)

RURAL SOCIOLOGY

(See Human and Community Development)

RUSSIAN

(See Slavic Languages and Literature)

RUSSIAN AND EAST EUROPEAN STUDIES

Director of Department: Mark Steinberg
Department Office: 104 International Studies Building, 910 South Fifth Street, Champaign
Phone: 333-1244
URL: www.uiuc.edu/unit/reec

Russian and East European Studies (REES)

200. Introduction to Russia and Central Eurasia
Survey of the societies and states formerly constituted as the Soviet Union. Interdisciplinary and team-taught; combines lectures, discussions, and films covering the history, po-

litical science, economics, sociology, and culture of the area. 3 hours.

290. Individual Study or Research

Directed reading or research on selected topics. *Prerequisite:* Consent of instructor supervising the work. 3 hours. May be repeated in separate semesters to a maximum of 6 hours.

295. Senior Seminar

Interdisciplinary seminar normally taken in the senior year. Involving faculty in a number of disciplines, this course approaches understanding Russia and Eastern Europe, and the methodologies of its study, through questions of identities, cultural values, and change. Taught in conjunction with REES 450. *Prerequisite:* Declared major in Russian and East European Studies or consent of instructor; junior or senior standing. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

450. Seminar in Russian and East European Studies

Interdisciplinary seminar required for candidates for the Master of Arts in REES. Team-taught, focusing each year on an introduction to Russian and East European studies as a discipline, plus surveys of four distinct areas of scholarly inquiry in the field. 1 unit.

490. Individual Study or Research

Directed reading or research on selected topics for graduate students. *Prerequisite:* Consent of instructor supervising the work. ¼ to 2 units. May be repeated in the same or separate semesters to a maximum of 2 units.

495. Independent Research Project

Designed to meet the research paper requirement for the M. A. in Russian and East European Studies; taken under supervision of a faculty member in the Russian and East European Center. *Prerequisite:* Enrollment in the M.A. program in REES, and consent of the Director of the Russian and East European Studies Center. 1 unit. Does not count as an area studies core course.

499. Thesis Research

Designed to meet the thesis requirement for the M.A. in Russian and East European Studies; taken under supervision of a faculty member in the Russian and East European Center. *Prerequisite:* Enrollment in the M.A. program in REES, and consent of the Director of the Russian and East European Center. 0 to 2 units. May be repeated in separate semesters to a maximum of 2 units. Approved for S/U grading only. Does not count as an area studies core course.

SANSKRIT

(See Linguistics)

SCANDINAVIAN

(See Germanic Languages and Literature)

SCULPTURE

(See Art and Design, School of)

SERBO-CROATIAN

(See Slavic Languages and Literature)

SLAVIC LANGUAGES AND LITERATURE

Acting Head of Department: Maurice Friedberg
Department Office: 3092 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 333-0680
URL: www.lang.uiuc.edu/slavic/home.html

Including Bulgarian (BULG), Czech (CZECH), Polish (POL), Russian (RUSS), Serbo-Croatian (S CR), Slavic (SLAV), and Ukrainian (UKR)

Bulgarian (BULG)

381. Structure of Modern Bulgarian

Analysis of the sound system and grammar of the contemporary Bulgarian language. *Prerequisite:* RUSS 214 or equivalent. 3 hours or ¾ unit.

382. Readings in Bulgarian Literature

Reading, analysis, and discussion of selected excerpts from Bulgarian literature, scientific prose, and the press. *Prerequisite:* BULG 381 or consent of instructor. 3 hours or ¾ or 1 unit.

Czech (CZECH)

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

383. The Structure of Modern Czech

Analysis of the sound system and grammar of the contemporary Czech language with some reference to its historical development. *Prerequisite:* Knowledge of another Slavic language, preferably Russian, or consent of instructor. 3 hours or ¾ unit.

384. Readings in Czech

Reading and analysis of selected texts. *Prerequisite:* CZECH 383, or consent of instructor. 3 hours or ¾ unit.

Polish (POL)**101. Elementary Polish, I**

Oral and written work on basic pronunciation, grammar, and vocabulary. For students with no prior work in Polish. 4 hours.

102. Elementary Polish, II

Continuation of POL 101. *Prerequisite:* POL 101. 4 hours.

103. Intermediate Polish, I

Grammar review, conversation practice, written exercises, and selected readings. *Prerequisite:* POL 102 or equivalent. 4 hours.

104. Intermediate Polish, II

Continuation of POL 103. *Prerequisite:* POL 103. 4 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

215. Introduction to Polish Literature, I

Reading and discussion of representative prose and poetry works of Polish authors since 1863. All readings are in the original language; the course emphasis is in the development of language skills. *Prerequisite:* POL 104 or consent of instructor. 3 hours.

216. Introduction to Polish Literature, II

Reading and discussion of representative prose and poetry works of Polish authors to 1863. All readings are in the original language; the course emphasis is in the development of language skills. *Prerequisite:* POL 215 or consent of instructor. 3 hours.

345. Polish Literature in Translation, I

Same as C LIT 335. Critical survey, in translation, of Polish literature from the Middle Ages to the end of the nineteenth century; special attention given to the works in their cultural context. 3 hours or 1 unit.

346. Polish Literature in Translation, II

Same as C LIT 336. Critical study, in translation, of modern Polish fiction, drama, poetry, and essay, from Young Poland to the "New Wave"; their contribution to literary styles and genres in Poland and abroad; special emphasis on Wyspianski, Witkiewicz, and Gombrowicz. 3 hours or 1 unit.

385. The Structure of Modern Polish

Analysis of the sound system and grammar of the contemporary Polish language. *Prerequisite:* Knowledge of another Slavic language or consent of instructor. 3 hours or ¾ unit.

386. Readings in Polish

Reading and analysis of selected texts. *Prerequisite:* POL 385 or consent of instructor. 3 hours or ¾ unit.

Russian (RUSS)

Note: Courses taught in Russian are 211, 213, 214, 215, 216, 301, 313, 314, 376, and 422.

101. First-Year Russian, I

Oral-aural practice and elements of grammar, reading, and writing. For students who have no credit in Russian. 4 hours. Students may not receive credit for both RUSS 101 and 121.

102. First-Year Russian, II

Continuation of RUSS 101. Oral-aural practice and elements of grammar, reading, and writing. *Prerequisite:* RUSS 101. 4 hours.

103. Second-Year Russian, I

Oral-aural practice, systematic functional grammar, reading, and writing. *Prerequisite:* RUSS 102 or equivalent. 4 hours.

104. Second-Year Russian, II

Systematic review of the structure of Russian covered in RUSS 101–103 through class lectures, drills, and homework exercises. *Prerequisite:* RUSS 103. 4 hours.

105. Conversational Russian

Service course to the professional colleges. Introduction to and practice in speaking and reading Russian. Course is designed for the applied use of daily living in contemporary Russia and includes topics of interest to students studying business, agriculture, engineering, and the sciences. Does not serve as a prerequisite for advanced courses in Russian without departmental approval that usually requires a proficiency examination at the 104 level. 3 hours. Students may not receive credit for RUSS 105, and for RUSS 101 and 102.

111. Intensive First-Year Russian

Accelerated course; covers material of RUSS 101 and 102 in one semester. Allows for more efficient scheduling, more effective drilling, and quicker mastery of basic grammar and vocabulary. 8 hours.

112. Intensive Second-Year Russian

Accelerated course; covers material of RUSS 103 and 104 in one semester. Allows for more efficient scheduling, more effective drilling, and quicker mastery of intermediate grammar and vocabulary. *Prerequisite:* RUSS 102 or 111. 8 hours.

113. Russian Civilization through Literature

The civilization of pre-Soviet Russia as reflected in Russian literature of the time. 3 hours.

114. Soviet and Post-Soviet Societies Through Literature

The political, cultural, and social realities of the Soviet Union and its successor states as reflected in the pertinent literature. 3 hours.

115. Russian Masterpieces in Translation, I
Introduction to major works from the medieval period to 1880 in the context of Russian history and European literature. 3 hours. No knowledge of Russian required.

116. Russian Masterpieces in Translation, II
Introduction to major works from 1880 to the present in the context of Russian history and European literature. 3 hours. No knowledge of Russian required.

119. Introduction to Russian and Soviet Film

Survey of major films, film makers, and trends from Tolstol adaptations through the revolutionary Eisenstein to current satire. Weekly film screenings. 2 hours. No knowledge of Russian required.

121. Beginning Russian for Reading

Survey of all grammar and basic vocabulary in one semester, in preparation for the reading of Russian prose in RUSS 200. No emphasis on speaking or writing; all exercises and tests are from Russian to English. 3 hours. Students may not receive credit for both RUSS 121 and 101.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Intermediate Reading and Translation
Development of rapid reading comprehension and vocabulary acquisition; includes unadapted nonfiction texts in various humanities and science fields. Class discussion entirely in English. *Prerequisite:* RUSS 104 or 121. 3 hours.

213. Russian Composition, I

Grammar review; training in writing Russian; translation from English and free composition. *Prerequisite:* RUSS 104 or consent of instructor. 3 hours.

214. Intermediate Composition and Conversation, II

Practice in intermediate-level speaking, listening, reading, and writing, based upon advanced grammar and conversation topics and upon readings from current fiction and nonfiction. Students are expected to write essays and give oral reports based on in-class assignments and outside interests. *Prerequisite:* RUSS 213, or consent of department. 3 hours. (Counts for advanced hours in L A S.)

215. Introduction to Russian Literature, I

Reading and analysis of 20th century Russian literary texts; conducted in Russian. *Prerequisite:* Three years of college Russian or consent of instructor. 3 hours.

216. Introduction to Russian Literature, II

Reading and analysis of 19th-century Russian literary texts; conducted in Russian. *Prerequisite:* Three years of college Russian or consent of instructor. 3 hours. (Counts for advanced hours in L A S.)

222. Dostoevsky and Tolstoy

Same as C LIT 248. The art and thought of two of Russia's, and the world's, greatest novelists. Readings and discussions in English. 3 hours. (May count for advanced hours in L A S. See L A S Handbook.)

225. Soviet and Post-Soviet Russian Literature

Same as C LIT 249. Major works since 1917 by Mayakovsky, Babel, Olesha, Bulgakov, Sholokhov, and others; readings and discussion in English. 3 hours. (May count for advanced hours in L A S. See L A S Handbook.)

271. Introduction to Second Language Learning and Teaching

Same as FR, GER, HUMAN, LAT, and SPAN 271. See HUMAN 271.

275. Developing and Implementing Communicative Language Teaching

Same as FR, GER, LAT, and SPAN 275. See SPAN 275.

278. Current Issues in Secondary Language Teaching

Same as FR, GER, LAT, and SPAN 278. See SPAN 278.

290. Readings in Russian

Individual topics or projects chosen in consultation with a Slavic Department representative. *Prerequisite:* RUSS 104 or equivalent proficiency. 1 to 4 hours. May be repeated to a maximum of 8 hours.

293. Honors Senior Thesis

Intended primarily for candidates for honors in Russian but open to other seniors. *Prerequisite:* Senior standing. 2 hours. May be repeated. (Counts for advanced hours in L A S.)

307. Structure of Russian

The syntax and morphology of modern Russian. *Prerequisite:* Three years of Russian or consent of instructor. 3 hours or ¾ unit.

308. Russian Phonetics and Pronunciation

Study of the Russian sound system; training in the improvement of pronunciation and intonation. *Prerequisite:* Three years of Russian or consent of instructor. 3 hours or ¾ unit.

313. Advanced Composition and Conversation, I

Practice in advanced speaking, listening, reading, and writing, based upon reading selected from current fiction and nonfiction, and covering a wide variety of styles: literary, conversational, scientific, etc. Course taught in Russian. Students are expected to write essays and give oral reports based on what they read in class and on their outside interests. *Prerequisite:* Three years of college Russian or consent of instructor. 3 hours or ¾ unit.

314. Advanced Composition and Conversation, II

Practice in advanced speaking, listening, reading, and writing, based upon reading selected from current fiction and nonfiction, and covering a wide variety of styles: literary, conversational, scientific, etc. Course taught in Russian. Students are expected to write

essays and give oral reports based on what they read in class and on their outside interests. *Prerequisite:* RUSS 313 or consent of instructor. 3 hours or ¾ unit.

315. Nineteenth-Century Literature in Translation

Same as C LIT 337. Study of major Russian writers from Pushkin through Chekhov; no knowledge of Russian required. 3 hours, or ¾ or 1 unit.

317. Twentieth-Century Literature in Translation

Same as C LIT 338. Study of major Russian writers from 1900 to the present; no knowledge of Russian required. 3 hours, or ¾ or 1 unit.

324. Russian Modernism

Same as C LIT 357. Representative works of the period 1880 to 1917, with emphasis on Chekhov, Gorky, and Blok; readings for nonmajors and class discussions in English. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or ¾ or 1 unit.

335. Russian Drama

Same as C LIT 368. Historical survey of Russian dramatists and their works, from the origins in folk and liturgical playlets through classicism, Gogol, Ostrovsky, Chekhov, and Stanislavsky to Meierhold and the Soviet drama. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or ¾ or 1 unit.

338. Modern Russian Poetry

Study of major Russian poets and their works from romanticism to the present. Historical background, textual analysis, and connections with Western European poetry. *Prerequisite:* RUSS 216 or consent of instructor. 3 hours, or ¾ or 1 unit.

344. Pushkin and Russian Romanticism

Study of major authors of the romantic period, with the inclusion of several lesser authors, such as Mikhail Lermontov. Historical background, textual analysis, and connections with Western European romanticism. *Prerequisite:* RUSS 115 or 116 or consent of instructor. 3 hours, or ¾ or 1 unit. Offered in alternate years.

345. Nineteenth-Century Russian Realism

Study of the major texts of nineteenth century Russian realism, including works by Turgenev, Goncharov, Nekrasov, Dostoevsky, and Tolstoy. Historical background, relevant intellectual currents, textual analysis, and connections with Western European realist authors. *Prerequisite:* RUSS 115 or 116, or consent of instructor. 3 hours, or ¾ or 1 unit. Offered in alternate years.

354. Russian Short Fiction

Survey of the evolution of the Russian short story/novella with the emphasis on major authors such as Tolstoy and Chekhov. Historical background, textual analysis, and connections with the Western tradition of short fiction. *Prerequisite:* RUSS 115 or 116, or consent of instructor. 3 hours, or ¾ or 1 unit. Offered in alternate years.

355. Russian Long Fiction

Survey of the evolution of the Russian novel and short novel, with emphasis on major authors. *Prerequisite:* RUSS 115 or 116, or consent of instructor. 3 hours, or ¾ or 1 unit. Offered in alternate years.

360. Studies in Russian Literature and Society

Same as C LIT 340. Role of Russian literature in the social, political, and intellectual life of Russia from the 1840s to the present. *Prerequisite:* Junior standing. 3 hours, or ¾ or 1 unit.

375. Russian Literary Translation

Theory and practice of literary translation in Russia from the eighteenth century to the present; "literal" versus "creative" translation; and practical work in translation into English of various Russian literary texts. *Prerequisite:* RUSS 214 or 216, or equivalent. 3 hours, or ¾ or 1 unit.

376. Russian Literary Criticism and Theory

Surveys major figures and approaches in Russian literary theory and criticism from the eighteenth century to the present. *Prerequisite:* RUSS 212 or 214; or equivalent proficiency. 3 hours, or ¾ or 1 unit. Taught in Russian.

400. Beginning Russian for Graduate Students

Basic grammar and vocabulary; introduction to the reading of Russian texts in the sciences and the humanities. Designed for graduate students preparing to offer a reading knowledge of Russian for the Ph.D. 3 hours. No graduate credit.

401. Readings in Russian for Graduate Students

Reading and translation of general and individually specialized materials; to increase speed, accuracy, and vocabulary; designed for graduate students preparing to offer a reading knowledge of Russian for the Ph.D. *Prerequisite:* RUSS 400 or equivalent. 3 hours. No graduate credit.

406. Russian Morphology

Survey of the various parts of speech of modern standard literary Russian with special emphasis on the nominal and verbal systems. *Prerequisite:* RUSS 307 or equivalent. 1 unit.

408. Russian Phonology

Same as LING 408. The sound pattern of Russian in its synchronic and diachronic aspects. *Prerequisite:* RUSS 308 or equivalent. 1 unit.

410. Old Russian Literature

Reading and analysis of texts with historical and literary commentary. *Prerequisite:* SLAV 405 or equivalent. 1 unit.

412. Literature of the Eighteenth Century

Reading of texts; historical and literary background of the period. 1 unit.

417. History of the Russian Language

Historical grammar, origin, and development of the literary language. *Prerequisite:* SLAV 380 or 405 or equivalent. 1 unit.

422. Russian Emigré Literature

Seminar of the most influential Russian émigré poets, prose writers, and critics: Adamovich, Aldanov, Bunin, Hippius, Georgy Ivanov, Poplavsky, Remizov, Solzhenitsyn, Teffi, Tsvetaeva, Nabokov, and Zaytsev. *Prerequisite:* Graduate standing. 1 unit. Taught in Russian.

463. College Teaching of Foreign Languages

Same as E 1 L, FR, GER, ITAL, PORT, and SPAN 463. See FR 463.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as E 1 L, FR, GER, ITAL, PORT, and SPAN 481. See FR 481.

Serbo-Croatian (S CR)**101. Basic Serbian or Croatian, I**

Oral and written work on pronunciation, grammar, and vocabulary. For students with no previous study of Serbian or Croatian. 4 hours.

102. Basic Serbian or Croatian, II

Continuation of S CR 101. *Prerequisite:* S CR 101 or equivalent proficiency. 4 hours.

103. Intermediate Serbian or Croatian, I

Completion of grammar; written and oral exercises aimed at active command of the language. *Prerequisite:* S CR 102 or equivalent proficiency. 4 hours.

104. Intermediate Serbian or Croatian, II

Selected readings in Serbian or Croatian literature and culture. *Prerequisite:* S CR 103 or equivalent proficiency. 4 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

392. Structure of Modern Serbian or Croatian

Analysis of the sound system and grammar of the contemporary Serbian or Croatian language. *Prerequisite:* Knowledge of another Slavic language or consent of instructor. 3 hours or ¾ unit.

393. Readings in Serbian and Croatian

Reading and analysis of selected texts. *Prerequisite:* S CR 392 or consent of instructor. 3 hours, or ¾ or 1 unit.

Slavic (SLAV)**117. Russian and East European Science Fiction**

Survey of the science fiction writing of Russia and the countries of Eastern Europe since 1750, with particular emphasis on the post-World War II period. The role of the science fiction tradition in the respective national cultures. The influence on Russian and East European science fiction of Anglo-American science fiction. All readings are in English. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

319. Studies in Russian and East European Cinema

Same as CINE, COMM, and SPCOM 319. Study and analysis of major film makers, genres, trends, and theories, including the 1920's Soviet avant garde and the Polish and Czech "New Wave" since 1953; lectures, discussions, screenings, term paper. No reading knowledge of Russian required, except for majors in Slavic Languages and Literature. *Prerequisite:* RUSS 119; or a college level course REES or in CINE; or consent of instructor. 3 hours, or ¾ or 1 unit.

352. Topics in Russian Literature and Slavic Literature

Selected topics in the literatures of Russia and Eastern Europe. Topics covered will range from in-depth studies of specific authors, time periods, and thematic discussions of specific genre and literary traditions. Readings in English unless specified. *Prerequisite:* Two years of literature, preferably Russian or East European; or consent of instructor. 3 hours or 1 unit. May be repeated in same semester to a maximum of 6 hours or 2 units. May be repeated in separate semesters to a maximum of 9 hours or 3 units.

377. East European Literatures

Same as C LIT 377. Examines masterpieces of Czech, Polish, and Yugoslav literatures from medieval times to the present in English translation. Representative works are by Capek, Kundera, Mickiewicz, Milosz, Andric, and others. Attention given to the European context and national traditions. *Prerequisite:* One course in Slavic literature. 3 hours, or ¾ or 1 unit.

380. Introduction to Slavic Linguistics

Same as LING 380. The development of Common Slavic from Indo-European and its relationship to contemporary Slavic languages. *Prerequisite:* Knowledge of a Slavic language. 3 hours, or ¾ or 1 unit.

381. Introduction to Study and Research in Slavic Languages and Literatures

Introduction to methods and resources for study and research in Slavic languages, Russian literature, and Russian language teaching. 2 hours, or ¼ or ½ unit.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E 1 L, FR, GER, HUMAN, ITAL, PORT, and SPAN 382, and LING 386. See HUMAN 382.

405. Old Church Slavonic

Analysis of grammar and reading of texts. *Prerequisite:* Knowledge of a Slavic language. 1 unit.

425. Seminar in Slavic Literature

Selected subjects in Russian and Slavic prose, poetry, drama, and literary criticism. Topics vary. 1 unit. May be repeated to a maximum of 3 units.

491. Individual Topics

Prerequisite: Graduate standing with a major or minor in Russian; consent of department. ¼ to 2 units.

499. Thesis Research

0 to 4 units.

Ukrainian (UKR)**101. Basic Ukrainian, I**

Oral and written work on basic pronunciation, grammar, and vocabulary. For students with no previous study of Ukrainian. 4 hours.

102. Basic Ukrainian, II

Continuation of UKR 101. *Prerequisite:* UKR 101 or equivalent proficiency. 4 hours.

103. Intermediate Ukrainian, I

Completion of grammar, oral drills, and written exercises. *Prerequisite:* UKR 102 or equivalent. 4 hours.

104. Intermediate Ukrainian, II

Selected readings in contemporary Ukrainian literature. *Prerequisite:* UKR 103 or equivalent. 4 hours.

115. Ukrainian Culture

Course situates Ukrainian culture in the broad context of Slavic nations. Acquaints students with Ukrainian culture from the origins of Kievan Rus' in the Middle Ages to the present. Includes highlights of historical-cultural events, an overview of literature and of the arts, as well as an outline of history in Ukrainian folklore. No knowledge of Ukrainian required. 3 hours.

118. Ukrainian Literature in Translation

Critical survey of major works in Ukrainian literature from the beginnings to the modern period in light of their historical and cultural background; lectures and readings in English. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

398. Ukrainian Literature in Translation

Critical survey of major works in Ukrainian literature from the beginnings to the modern period in light of their historical and cultural background; lectures and readings in English. 3 hours, or ¾ or 1 unit.

SOCIAL SCIENCE

Office: Peter F. Nardulli
Address: 361 Lincoln Hall, 702 South Wright
Street, Urbana
Phone: 333-3881
URL: www.pol.uiuc.edu

Social Science (SOC S)

300. Socio-Economic Management as Public Policy
Same as ACCY 322, B ADM and POL S 300.
See POL S 300.

SOCIAL WORK

Dean of School of Social Work: Jill Doner Kagle
School Office: 1207 West Oregon Street, Urbana
Phone: 333-2261
URL: www.social.uiuc.edu

Social Work (SOC W)

100. Contemporary Social Work
Broad survey of the field of social welfare; introduction to social services, social welfare organizations, major social problems and target population groups, and the methods employed in service to individuals, groups, and communities; and includes the range of personnel and skills in social work agencies, and the means of education and training for social work. 3 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

297. Asian Families in America
Offers a comparative analysis of Asian families as they cope and adapt to American society. Examines: 1) how families from four major Asian-American groups (Chinese, Indian, Japanese and Korean) function in American society; 2) how these families compare to families in their country of origin; and 3) how these families are similar to or different from the "typical American" family. Includes visits to Asian cultural institutions and with Asian families. 3 hours.

300. Methods of Social Work Intervention
Examination of the methods of social work intervention (casework, group work, and community organization) utilized in various social work agencies and social welfare settings; emphasis on understanding of the values, knowledge, principles, and processes of social work practice. *Prerequisite:* Admission to MSW program. 3 hours or 1 unit.

303. Delivery of Health Care: Problems and Perspectives

The wide range of factors—ecological, social, cultural, medical, organizational, economic, and political—which influence health care in a complex nation like the United States; attention to perspectives from various fields of study. *Prerequisite:* Junior standing and consent of instructor. 3 hours or 1 unit.

310. Social Welfare Policy and Services

Critical study of the income maintenance system in the United States as a response to the problems of inequality of opportunity and income, poverty, and income security; consideration of alternative approaches with discussion of the social worker's role in the system. 3 hours or 1 unit.

313. Social Services for Health and Rehabilitation

Psychological and sociological impact of illness and disability on the individual, the family, and the community, emphasizing the social worker's role in medical and rehabilitation settings. *Prerequisite:* Admission to MSW program, or consent of instructor. 3 hours or 1 unit.

314. Social Services in Mental Health and Retardation

Examination of comprehensive community mental health services as they evolve from definitions of the problems and changes in federal and state social policy; the concept of normalization and its criteria for program evaluation; and changing roles of mental health professionals, paraprofessionals, and consumers in policy making and service delivery. *Prerequisite:* Admission to MSW program, or consent of instructor. 3 hours or 1 unit.

315. Social Work Services for the Aged

Social needs of older people in the context of developing services and income transfer benefits; identifies major issues in social service delivery; and reviews methods of intervention on behalf of older people in terms of both skill required and policy implications. *Prerequisite:* Admission to MSW program, or consent of instructor. 3 hours or 1 unit.

316. Social Services for Children and Families

Child and family welfare policies and practice in relation to social services which support, supplement, or substitute for parental care of children; practice and policy issues in relation to the state's responsibility for guardianship, juvenile court, employment of children and young persons, and regulation of child-care facilities; and consideration of trends and issues in family and child welfare planning. *Prerequisite:* Admission to MSW program, or consent of instructor. 3 hours or 1 unit.

318. Special Problems

Small group seminar for independent study of a topic or topics of special interest in the field of social welfare; emphasis on examination and discussion of significant and current social welfare issues and problems. *Prerequisite:* Credit or concurrent registration in SOC W 300; consent of instructor. 3 hours or 1 unit.

319. Social Work and the Public School

Social work services in schools as a process in school-community-pupil relations; focuses on the school as a social system; includes education as a continuum from pre-school to adulthood, financing and other major problem areas, education, legislation, policies, and service needs, some current education innovations; contains content related to meeting the needs of exceptional children and their families in the public schools. *Prerequisite:* Graduate standing in social work or consent of instructor. 4 hours or 1 unit.

320. Prevention and Treatment of Substance Abuse

Multidimensional factors associated with treatment and prevention of addiction in society are examined. Emphasis is placed on the relationship between drug use and a broad range of social circumstances associated with the socio-economic status, race/ethnicity, and gender. Particular attention is given to policy and service issues regarding the treatment and prevention of drug abuse from an ecological perspective (i.e., the social environments, physical settings, and community contexts that support or inhibit the development of drug problems). *Prerequisite:* Admission to MSW program or consent of instructor. 3 hours or 1 unit.

322. Introduction to Mental Retardation

Same as PSYCH, REHAB, and SP ED 322. See SP ED 322.

327. Research Methods in Social Work Practice

Objectives of research pertaining to social work practice; design of experiments; measurement and methods of collecting data; design of questionnaires and schedules; methods of data analysis including statistical hypothesis testing and applications of inferential techniques; interpretation of results; and preparation of reports. *Prerequisite:* An introductory course in statistics; and for fall semester enrollment is limited to social work students. 3 hours or 1 unit.

351. Human Behavior and Social Environment, I

Current research and theory concerning the environmental influences on individual behavior; the family, small group, community, and social organization and the social and cultural causes and effects of discrimination. The social work practice context of each unit of content is a central focus. *Prerequisite:* For fall semester enrollment is limited to social work students. 3 hours or 1 unit.

357. Health Planning

Same as CHLTH 357. See CHLTH 357.

400. Comparative Analysis of Approaches to Casework

Systematic and critical examination of selected approaches, conceptualizations, procedures, and techniques in casework theory and practice; includes the employment of a framework for the analysis and assessment of the various approaches, study of research related to process and outcome, and identification of practice issues. *Prerequisite:* SOC W 300. 1 unit.

401. Comparative Approaches to Social Group Work Practice

Social work practice theory in social group work through comparative study of various practice approaches; includes the utilization of the group work method in contemporary social work practice, practice principles, and the use of group process. *Prerequisite:* SOC W 300. 1 unit.

402. Comparative Approaches in Community Organization Practice

Principles and methods which characterize identifiable approaches used in community organization practice at neighborhood, community, state, and other levels. *Prerequisite:* Graduate standing in social work; SOC W 300 or consent of instructor. 1 unit.

405. Behavior Modification in Social Work

Examination of conceptual ideas about behavior modification and their usefulness in working with clinical problems of concern to the social worker; focuses on intervention with individuals and families and the application of behavioral principles in working with groups, institutions, and communities; and emphasizes the development of a systematic approach for applying behavior modification principles in actual practice situations. *Prerequisite:* SOC W 300. 1 unit.

406. Intervention with Children and Adolescents

Examination and critical evaluation of selected methods/approaches of intervention; research on their effectiveness and application to specific problems of children and adolescents that come to the attention of social workers and other helping professionals; attention given to remediation and prevention. *Prerequisite:* SOC W 351 or equivalent, and SOC W 300 or consent of instructor. 1 unit.

407. School Social Work Practice

Ecological systems approach to social work intervention within the public school system; examination of practice principles, issues, and strategies for organizational change, collaborative team work with school and community professionals, and intervention, especially group work, with students and families; contains content related to meeting the needs of exceptional children and their families. *Prerequisite:* SOC W 300 and graduate status, or consent of instructor. 1 unit.

420. Social Welfare Planning

Examination of the interactional, interpersonal, and political aspects of social welfare planning in a variety of settings and under a number of auspices; formulation of models for social welfare planning. *Prerequisite:* Admission to MSW program or consent of instructor. 1 unit.

426. Social Welfare Administration

Principles and process of administration and management of social welfare organizations, including review of organization theory, policy formulation, agency structure and staff organization, and budgeting. *Prerequisite:* Admission to MSW program or consent of instructor. 1 unit.

427. Service Accounting in Social Welfare

Examines different types of services, to whom they are provided at what costs and with what results; within a systems perspective, considers methods of describing, reporting, and measuring client and target population characteristics, services, and resources; and includes allocation of scarce resources among competing demands and practice in specific methods. *Prerequisite:* SOC W 327 or equivalent. 1 unit.

428. Family Therapy Seminar and Practicum

The principles, issues, and practices of family therapy; examines and compares major theoretical concepts; and enables students to learn how to do family therapy by studying theory and applying it in an actual practice experience. *Prerequisite:* SOC W 400 or consent of instructor. 1 unit.

431. Practice in Organizational Settings

Critical analysis of social work practice: the agency's target population and clientele, task environment, structure, functions, task definitions, monitoring and planning mechanisms; methods of service delivery; ethical and legal considerations in service delivery; the impact of racism, ethnocentrism, and sexism on social work practice. Section for school social work students contains content related to meeting the needs of exceptional children and their families in the public schools. *Prerequisite:* Concurrent registration in SOC W 468. 1 unit.

432. Practice Evaluation

Evaluation of social work practice: defining practice problems; operationalizing goals and objectives; developing hypotheses; designing evaluation plans to test hypotheses; describing interventions; collecting, analyzing, and interpreting data; and presenting results. Students complete an evaluation of some aspect of their own practice or their agency's program. *Prerequisite:* SOC W 431; concurrent registration in SOC W 469. 1 unit.

435. Supervision/Consultation/Staff Development

The philosophy, objectives, principles, and methods of social work supervision, consultation, and training for staff development; analysis of similarities and differences in roles, knowledge, and skills required with emphasis on the teaching-learning-evaluating components; and issues arising from agency setting, changing legislation and program provisions, and relationships to social welfare administration. *Prerequisite:* Graduate standing in social work or consent of instructor. 1 unit.

439. Theory of Social Work Interventions

Presents theory for social work interventions with individuals, families, groups, and communities and organizations; critically analyzes different theoretical frameworks for such interventions; and examines the conceptual links between theory, process, outcome, and evaluations. *Prerequisite:* SOC W 400, 401, and 402. 1 unit.

451. Women: Society and Social Welfare Issues

Same as W S 451. Examination and critical evaluation of current research on theory concerning the environmental influences on women's behavior and application of these ideas in practice and policy; attention given to both dynamics of victimization and change strategies as they affect women and children in the social welfare system; emphasis on issues of special concern to poor and minority women. *Prerequisite:* SOC W 351 or consent of instructor. 1 unit.

452. Human Growth and Behavior and the Social Environment, II: Psychosocial Disorders

Interrelationship of physical, emotional, learning, and social aspects of behavior disorders, and implications for the patient, family, and community; psychopathology, including neuroses, psychoses, character disorders, organic conditions, psychophysiologic disorders, and mental retardation; and diagnosis and treatment methods, including psychotherapy, somatic and drug therapies, and social work. *Prerequisite:* SOC W 351 or equivalent. 1 unit.

461. Special Studies in Social Work, I

Independent or group study in areas of special interest; application of social work principles to special problems or settings. *Prerequisite:* Consent of instructor. ½ to 2 units.

462. Special Studies in Social Work, II

Independent or group study in areas of special interest; application of social work principles to special problems or settings. *Prerequisite:* Consent of instructor. ½ to 2 units.

468. Field Instruction, II

The student is assigned to field instructors for learning experiences in social agencies and communities. Such experiences include the use of knowledge and understanding in analyses of case and problem situations and in direct service to agency clientele. *Prerequisite:* Consent of instructor. 1 to 2 units.

469. Field Instruction, III

The student is assigned to field instructors for learning experiences in social agencies and communities. Such experiences include the use of knowledge and understanding in analyses of case and problem situations and in direct service to agency clientele. *Prerequisite:* SOC W 468. 1 to 2 units.

484. National Social Welfare Policy, I

Analyzes alternative concepts of social policy, the policy formulation process, and constraints on policy development in the United States; examines approaches to assessment of social policies. 1 unit.

485. National Social Welfare Policy, II

Emphasis on the case approach within the context of basic political and governmental processes which influence the development, enactment, and application of national policy; analytical study of the background, legislative history, amendments, judicial interpretations, and operation of major national acts comprising our national social welfare policy, or bearing directly on social welfare such as the So-

cial Security Act, the Employment Act, the Civil Rights Acts, and the Economic Opportunity Act. *Prerequisite:* SOC W 484 or consent of instructor. ½ to 2 units.

489. Social Work and the Law

Legal procedures and issues of special relevance to social work practice; includes legal provisions related to poverty, family development and crises, racial and ethnic minorities, institutionalized persons, crime and delinquency, legal authority of social agencies, and regulation of the profession. *Prerequisite:* Graduate standing in social work or consent of instructor. 1 unit.

490. Advanced Child Welfare

The unifying theme is strengthening families, establishing permanent and/or stable homes for children and youth, and preparing young people for independent living. The class is conducted in a seminar format, and priority is given to the stimulation of analytical thinking between and among seminar participants and the application of new ideas to child welfare practice. The goal of the course is to facilitate critical analysis of the knowledge base of child welfare. *Prerequisite:* SOC W 316; admission to the MSW program or consent of instructor. 1 unit.

491. Research Seminar

Seminar for students preparing research projects, either in groups or individually; experience in the application of research methods to current social work problems. *Prerequisite:* SOC W 327 or equivalent. 1 to 2 units.

493. Seminar: Design of Social Work Research

Issues and problems in social work research; includes proof and verification, generalizability, and use of scaling and of judgments; and design of original research study. *Prerequisite:* Admission to Ph.D. program and SOC W 327, or consent of instructor. 1 unit.

494. Individual Research

Course is designed to enhance the research skills of doctoral students in social work through research collaboration with a faculty member. *Prerequisite:* SOC W 493. 1 unit. May be repeated in separate semesters to a maximum of 2 units.

499. Thesis Research

Research and writing of doctoral thesis. 0 to 4 units.

Sociology (SOC)

100. Introduction to Sociology

Examination of how societies grow and change; reciprocal effects of economic, political, community, familial, and scientific institutions on each other and on individual life changes; and social conflict, problems of bureaucratic growth and planned and unplanned social change. 4 hours.

108. The Sacred Mind: Religion and Society in Western Thought from Antiquity to the Enlightenment

Same as ANTH, PHIL, and RELST 108. See RELST 108.

109. The Secular Mind: Religion and Society in Western Thought from the Enlightenment to the Present

Same as ANTH, PHIL, and RELST 109. See RELST 109.

122. Africa in World Perspective

Examination of Africa in the context of the world-economy, with particular attention placed upon enduring cultural and material relationships with Europe and North America. 3 hours.

131. Social Problems

Origin of problems; consequences of ameliorative strategies. Typical topics include crime, mental illness, drug use, suicide, sexual behavior, violence, and intergroup conflict. 3 hours.

145. Introduction to Women's Studies in the Social Sciences

Same as HDFS 145 and W S 112. See W S 112.

150. The Construction of Science

What scientists actually do; readings, discussions, and essay projects to develop an understanding of both the technical and social aspects of scientific practice, what is distinctive about science as well as illuminating the interrelation of science with other elements of our culture; includes a cultural analysis of technology. *Prerequisite:* For students in the Campus Honors Program; others may enroll with the consent of instructor and the Director of the Honors Program. 3 hours.

185. Introduction to Social Statistics

Same as GEOG 185. First course in social statistics for students without mathematics beyond the high school level; topics include the role of statistics in social science inquiry, measures of central tendency and dispersion, simple correlation techniques, contingency analysis, and introduction to statistical inference; includes the statistical analysis of social science data using personal computers. 4 hours. Students may not receive credit for SOC 185 if they have already received credit for a college level introductory statistics course.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Introduction to Sociological Theory

Analysis of such classical theorists as Marx, Weber, Durkheim, and Mead and contempo-

rary theorists. *Prerequisite:* Sophomore standing. 3 hours.

201. Introduction to Social Psychology

The social context of individual and interpersonal behavior. Observation, experimental, and survey studies of: socialization; language acquisition and use; sources and changes of self concept; social interaction; emotions; coordination of interpersonal behavior; individual and interpersonal aggression, violence, and control; and adoption or rejection of innovations through social networks. *Prerequisite:* Sophomore standing. 3 hours. Credit is not given for both SOC and PSYCH 201.

206. Political Sociology

Study of power relations within and between the state, bureaucracy, community, social classes, and elites in the United States and other countries. 3 hours.

218. Technology and Society

Examines the social and cultural origins of modern technology and technological innovation; the effects of technology and its change on society. Topics include the impact of technology on beliefs and values, accommodation and resistance to change, and technology and the Third World. 3 hours.

222. Introduction to Modern Africa

Same as AFRST, ANTH, and POL S 222. See AFRST 222.

223. Social Stratification

Inequities in power, prestige, income, privilege, and lifestyles in the United States and other countries; class and status as determinants of group interests, ideologies, and interaction; and effects of social change and mobility. *Prerequisite:* SOC 100. 3 hours.

225. Race and Ethnicity

Same as AFRO 225. Sociological and social-psychological analysis of minority groups; illustrative material drawn from representative racial, ethnic, and status groups. *Prerequisite:* SOC 100. 3 hours.

227. Latina/Latinos in Contemporary United States Society

Same as LLS 227. Examines the incorporation of the major Latina/Latino subgroups into United States society, surveys the major theoretical approaches that have been used in the social sciences to explain majority-Latino relations, and provides an empirical overview of how major social institutions affect the daily lives of Latina/Latinos. *Prerequisite:* LLS 100 or SOC 100, or consent of instructor. 3 hours.

229. Religion and Society

Same as RELST 229. The social construction and maintenance of religious belief and action; the problem of theodicy; religious anomie and alienation; secularization, modernization, and religious pluralism. 3 hours.

231. Juvenile Delinquency

Historical change in definitions of delinquency, its causes and control; gangs; the juvenile justice system; treatment of offenders; and preventive programs. *Prerequisite:* SOC 100. 3 hours.

SOCIOLOGY

Head of Department: John J. Lie

Department Office: 326 Lincoln Hall, 702 South Wright Street, Urbana

Phone: 333-1950

URL: www.soc.uiuc.edu

240. Crowds, Social Movements, and Violence

Crowd formation and participation; recurring forms of individual and social behavior in crowds; routine and problematic crowd dispersal; social movement origins and participation; growth and organization; strategies, tactics, and consequences for participants and society; origins and consequences of racial, prison, sports and festival riots, and of violent confrontations between protest movements and the police. *3 hours.*

243. Social Perspectives on the Family

Examines the societal forces shaping aspects of stable and changing family relations in the U.S. and other countries; focuses on social-structural factors affecting marriage, divorce, cohabitation, child-bearing, the division of work and authority, and other features of life. *Prerequisite:* SOC 100. *3 hours.*

249. Sport and Modern Society

Same as KINES 249. See KINES 249.

251. Social Aspects of Mass Communications

Same as COMM and JOURN 251. See COMM 251.

264. Introduction to Medical Sociology

Sociology of health and illness behavior and the social structure of systems which deliver health care services; includes social constraints on illness, the illness role, medical organizations and professions, and the application of the illness model to deviant forms of behavior. *Prerequisite:* SOC 100. *3 hours.*

265. Contemporary Korean Society

Same as EALC 265. See EALC 265.

267. Pan Africanism in the Americas, Europe, and Africa

Same as AFRO, AFRST, and POL S 243. See POL S 243.

270. Population Issues

Same as R SOC 270. Examines the current world population situation; the historical and current patterns of birth, death, migration, marriage, contraception, and abortion; and the world food and energy resources, crowding, and problems of overpopulation. *3 hours.*

275. Community

Sociological analyses of community, focussing on the social composition, dynamics, uses, value systems, and other cultural features and collective action processes of various community types. The modern and continuing transformation of communities, including disintegration, social construction, and intentional formation, as well as persistence. Students do a small-scale community study. An intensive writing course. *Prerequisite:* Completion of campus Composition I general education requirement; SOC 100 and 185. *3 hours.*

280. Social Research Methods

Introduction to the foundations of social research and to the major types of research methods employed in sociology. Provides exposure to the major tools and terminology of social research, including the use of computers in sociology. Topics include: research design,

finding and using sociology literature, measurement, sampling, survey research, field methods, use of available data, quantitative data analysis and presentation, and computer resources for research. *Prerequisite:* SOC 100 and 185. *4 hours.*

287. Asian American Experiences

Same as ANTH 287. See ANTH 287.

290. Individual Study

Individual study or research project. *Prerequisite:* Six hours of sociology; written consent of instructor on form available in 326 Lincoln Hall. *1 to 6 hours.* May be repeated.

291. Honors Individual Study

Prerequisite: Open only to seniors in the sociology major who have an overall GPA of 3.3 or higher and therefore may be eligible for departmental distinction. *3 hours.* May be repeated. (Counts for advanced hours in L A S.)

295. Junior-Senior Honors Seminar

Intensive scrutiny of current literature on one selected topic. Critical reading and discussion followed by writing essays and research proposals. Subject will shift yearly. There may be community work as an aspect of this course; consult the *Timetable* for details. *Prerequisite:* For sociology majors only. Student must have at least 3.5 GPA in sociology courses and consent of instructor. *3 hours.* May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

296. Special Topics

Prerequisite: SOC 100 and consent of instructor. *3 hours.* May be repeated as topics vary.

299. Internship

Selected internship opportunities in which student and faculty member develop a program of study and research related to internship. Consult departmental undergraduate adviser. *Prerequisite:* Junior or senior standing; 3.0 GPA ; SOC 100, 185, and six additional hours in sociology; acceptance of faculty member and Director of Undergraduate Studies. *0 to 3 hours.* May be repeated to a maximum of 6 hours.

301. European Working Class History: 1750 to the Present

Same as HIST and L I R 301. See HIST 301.

302. Sex Roles

Same as HDFS and W S 302. See HDFS 302.

303. Gender Stratification

Integrates sociological and feminist theories of stratification by first critiquing mainstream stratification literature and discussing the inadequacies of subsequent approaches, then comparing and contrasting various feminist perspectives on the links between work, family, and the state. Students will identify potential sources of gender bias within specific social institutions. *Prerequisite:* SOC 280 or equivalent, or consent of instructor. *3 hours or 1 unit.*

304. Thought and Society in Early Modern Europe, 1789–Present

Same as HIST 346. See HIST 346.

314. Race and Ethnic Issues in Family Sociology and Education

Same as AFRO, E P S, and HDFS 314. See E P S 314.

315. Sociology of Education

Same as E P S 315. See E P S 315.

317. Sociology of Law

Social origins and consequences of law and legal process, emphasizing problems of legal change and structure and function of legal sanctions. Law and law-like phenomena in primitive and modern societies. *Prerequisite:* SOC 100 or six hours of anthropology, social geography, political science, or sociology. *3 hours, or 1/2 or 1 unit.*

322. Global Racial Formation and Stratification

Examines the social construction of racial consciousness and communities as a global process. Moves from the creation of a Black/White global divide with slavery and colonialism to contemporary stratification, identity, and movements. *Prerequisite:* SOC 122, or 225, or consent of instructor. *3 hours or 1 unit.*

325. The Philosophy of Social Science

Same as ANTH 329 and PHIL 375. See PHIL 375.

331. Criminology

Nature and extent of crime; past and present theories of crime causation; criminal behavior in the United States and its relation to personal, structural, and cultural conditions. *Prerequisite:* SOC 280 and 231, or consent of instructor. *3 hours, or 1/2 or 1 unit.*

332. Research Methods in Social Psychology: Laboratory Methods

Same as PSYCH 332. See PSYCH 332.

335. Ethnography of Local Cultures

Same as ANTH and EDPSY 335. See EDPSY 335.

338. Geography of Health Care

Same as GEOG 338. See GEOG 338.

339. The Organization of Health Care

Same as CHLTH 356. See CHLTH 356.

340. Social Movements

Origins and development of groups in promoting and resisting change, resource mobilization, strategies and tactics, individual and social consequences. *Prerequisite:* SOC 100 or six hours of anthropology, social geography, political science, or sociology. *3 hours, or 1/2 or 1 unit.*

341. Crowds and Collective Action

Contemporary theory and research on the life course of temporary gatherings, including religious, sport, political, and selected other social gatherings. Assembling and dispersing processes, and recurring forms of collective action within the intervening gatherings. Planning, mobilization, coordination, and social control of complex gatherings. Consequences of gatherings for participants and society. *Prerequisite:* SOC 280 or equivalent, and either

SOC 201, 206, or 240; or consent of instructor. 3 hours or 1 unit.

343. Social Change in Developing Areas
Same as R SOC 343. See R SOC 343.

345. Communication in Environmental Social Movements
Same as AGCOM 348, NRES 358, and ENVST 345. See AGCOM 348.

346. Sociology of Sport
Same as KINES 349. See KINES 349.

347. Environmental Sociology
Same as ENVST and R SOC 347. Examination of historical and modern consequences of environmental alteration and pollution and resource limitations on human populations in the context of various social change theories. Explores the environmental movement, population explosion, the "limits to growth" debate, and the impacts of environmental change on food production, land, and water quality. *Prerequisite:* SOC 100, R SOC 110, or equivalent; and SOC 280 or equivalent; or consent of instructor. 3 hours or ¾ unit.

349. Science, Technology, and Environmental Policy
Same as NRES 349. See NRES 349.

352. Attitude Theory and Change
Same as COMM and PSYCH 352. See PSYCH 352.

357. Human Rights
Same as POL S 357. Examines the idea of human rights: human rights in liberal democracies, especially in the United States; in pre-industrial societies; in totalitarian states. Studies human rights and cultural evolution; justification of human rights. *Prerequisite:* SOC 100 or consent of instructor. 3 hours, or ½ or 1 unit.

359. The Social Psychology of Organization
Same as PSYCH 359. See PSYCH 359.

364. Population Trends and Patterns
Introduction to contemporary demographic patterns and their historical development; transition theory and other models of demographic change; components of population growth and distribution; and trends and differentials in mortality and fertility. *Prerequisite:* SOC 270 and 280, or consent of instructor. 3 hours or 1 unit.

366. Sociology of Scientific Knowledge
Sociological analysis of the production, evaluation, the impact of social interests on the development of scientific knowledge, Kuhn's analysis of science, the social shaping of technology, the rationality debate. *Prerequisite:* SOC 200 or 218, or consent of instructor. 3 hours or 1 unit.

367. Seminar in Sociology of Technology
Explores important contemporary perspectives on the nature of technoscience (science-based technology), its origins and patterns of development, and the distinctive social forms within which it is embedded. *Prerequisite:* SOC

200 or 218, or consent of instructor. 3 hours or 1 unit.

373. Latin American Social and Political Institutions
Class structures, family, kinship, religious, economic, and political institutions; trends in urbanization, ecological organization, and population. *Prerequisite:* SOC 280 or consent of instructor. 3 hours, or ½ or 1 unit.

380. Methods of Field Research
Instruction, training, and supervised practice in methods of field research as a basic tool of sociology; emphasis on the role of the field researcher as participant, observer, and interviewer in various kinds of research settings, and on approaches to and applications of field data. *Prerequisite:* SOC 280 or consent of instructor. 3 hours, or ½ or 1 unit.

381. Survey Research
Principles and applications of social science survey research methods; class project designing and conducting a sample survey; training and experience in analysis of survey data; sampling, questionnaire construction, interviewing and data reduction, and file management; and direct use of the computer in survey data analysis. *Prerequisite:* SOC 280 or consent of instructor. 3 hours or 1 unit.

385. Social Statistics, I
Intermediate course in the theory and application of statistical methods to social science data. Coverage includes overviews of measurement issues, the logic of hypothesis testing and estimation, the general linear model, one-way analysis of variance, correlation, and regression. The core of the course is multiple regression analysis and its extensions. Topics include dummy variable analysis, statistical interaction, model assumptions and violations, nonlinear and logistic regression, and an introduction to path analysis. Emphasis on the application of statistical computing packages (e.g., SPSS) and the substantive interpretation of results. *Prerequisite:* SOC 185 or equivalent. 3 hours or 1 unit. Students may not receive credit for both this course and another course with a primary focus on applied multiple regression analysis such as ECON 173, STAT 320, or PSYCH 306. Graduate students must incorporate research literature involving statistical analysis from their discipline into their assignments and class discussions.

386. Social Statistics, II
Examines social science applications of the general linear model and its extensions; topics include: model specification; ordinary and generalized least squares; multicollinearity; selection of predictors; interaction of variables and nonlinear regression; panel and time-series data; measurement error; path analysis; recursive and nonrecursive structural equation models. Applies statistical computing packages (e.g., SPSS) to social science data. *Prerequisite:* SOC 385 or equivalent. 3 hours or 1 unit. Students may not receive credit for both SOC 386 and PSYCH 306.

387. Social Statistics, III
Examines social science applications of discrete and continuous multivariate analysis;

topics include: analysis of categorical data (loglinear modelling, probit analysis, etc.); geometric interpretation of matrices; factor analysis and index construction; canonical analysis; discriminant analysis; unobserved variables and structural equation models; issues in model specification and estimation. Applies statistical computing programs such as ECTA and LISREL to social science data. *Prerequisite:* SOC 386 or equivalent. 3 hours or 1 unit. Students may not receive credit for both SOC 387 and PSYCH 307.

388. Demographic Methods
Introduction to statistical and mathematical procedures in population analysis; the gathering, processing, and evaluating of registration and census data; the life table model; and procedures of mortality and fertility analysis and population projections. *Prerequisite:* SOC 280 and either SOC 264 or 270, or consent of instructor. 3 hours or 1 unit.

396. Special Topics
Prerequisite: SOC 100 or six hours of anthropology, social geography, political science, or sociology. 3 hours or 1 unit. May be repeated as topics vary.

400. Classical Sociological Theory
Analysis of major classical sociological theorists of the nineteenth and early twentieth centuries, stressing the social, historical, and philosophic foundations of sociological theory; primary emphasis on Marx, Durkheim, and Weber. *Prerequisite:* SOC 200 or equivalent. 1 unit.

401. Contemporary Sociological Theory
Major theorists and schools of thought since World War I with emphasis on the contemporary period; includes functionalism, exchange theory, conflict theory, symbolic interaction, and phenomenology. *Prerequisite:* SOC 400 or equivalent. 1 unit.

406. Psychological Scaling: Unidimensional Methods
Same as PSYCH 406. See PSYCH 406.

409. Psychological Scaling: Multidimensional Methods
Same as PSYCH 409. See PSYCH 409.

410. Core Seminar in Science, Technology, Information, and Medicine Studies
Same as HIST 410. Major issues and perspectives in social studies of science and technology, including information technology and medicine. 1 unit.

414. Seminar on Social Interaction
Same as COMM 414. Analysis of social interaction based on the social psychology of C. H. Cooley, G. H. Mead, and W. I. Thomas; presentation of problems of theory, concepts, and method. *Prerequisite:* 1 unit of graduate credit in sociology. 1 unit.

416. Survey Research Methods, II
Laboratory course in survey research methods to provide students with advanced training and experience in problem formulation and computerized data analysis using statistical packages, e.g., SPSS; under staff guidance, a

student will select a topic and write a professional-level paper. 1 unit. Three to ten hours of laboratory time per week.

417. Community Studies Theory
Same as HCD and U P 417. See HCD 417.

418. Seminar in Industrial and Economic Sociology
Same as L I R 418. See L I R 418.

421. Demography and Human Ecology
Classic and contemporary issues and perspectives in demography and human ecology, emphasizing the relationship between demographic phenomena and social life and on the ecological approach to social organization; demographic change, analytic methods in demography, fertility, mortality, and migration; new research developments. *Prerequisite:* Graduate standing, or consent of instructor. 1 unit.

422. Recent Developments in Transnational Studies

Intensive study of a selected area in transnational sociology, e.g., diasporas, global political economy, global environmental studies, transnational racial stratification, etc. *Prerequisite:* Graduate standing and consent of instructor. 1 unit. May be repeated in the same or separate semesters to a maximum of 2 units as topics vary.

423. Social Psychology
Development of social psychology; contemporary theoretical and methodological perspectives; selected areas of research. *Prerequisite:* Graduate standing, or consent of instructor. 1 unit.

425. Feminist Scholarship in the Social Sciences: Theory and Research
Same as W S 402. See W S 402.

445. Sociology of Leisure
Same as LEIST 445. See LEIST 445.

456. Organizational Sciences, I
Same as B ADM 410, POL S 460, and PSYCH 453. See B ADM 410.

456. Individual Behavior in Organizations
Same as B ADM 410, POL S 460, and PSYCH 453. See B ADM 410.

474. Survey Methods in Marketing Research
Same as B ADM 431. See B ADM 431.

482. Recent Developments in Sociology
Intensive study of selected topics based on contemporary works of major importance in the development of sociological theory. 1 unit. May be repeated as topics vary.

485. The Sampling of Human Populations and Social Organizations
Same as B ADM 435 and PSYCH 485. See B ADM 435.

488. Covariance Structure and Factor Models
Same as EDPSY, PSYCH, and STAT 488. See PSYCH 488.

490. Individual Topics in Sociology
Supervised individual investigation or study of a topic not covered by regular courses; topic selected by the student and the proposed plan of study must be approved by the adviser and the staff member who supervises the work. ¼ to 2 units.

494. Multivariate Analysis in Psychology and Education
Same as EDPSY and PSYCH 494. See PSYCH 494.

499. Thesis Research
0 to 4 units.

SPANISH, ITALIAN, AND PORTUGUESE

Head of Department: Ronald W. Sousa
Department Office: 4080 Foreign Languages Building, 707 South Mathews Avenue, Urbana
Phone: 333-3390
URL: www.lang.uiuc.edu/sip

Including Catalan (CATAL), Italian (ITAL), Portuguese (PORT), Romance Linguistics (RMLNG), and Spanish (SPAN)

Catalan (CATAL)

291. Intensive Catalan Language
Intensive introduction to the Catalan language, appropriate for students familiar with another Romance language; emphasizes acquisition of the four basic skills (listening, speaking, writing, and reading) in order to achieve competence in the language. *Prerequisite:* Basic reading knowledge of another Romance language is helpful but not absolutely necessary. 3 hours.

302. Studies in Catalan Literature
Studies selected aspects of Catalan literature; taught in Catalan. Topics will be selected from among the major chronological periods and genres of Catalan literature, such as the 20th-century novel, Ramon Llull, and Ausias March. The intention is to offer the student an in-depth view instead of an introductory overview. *Prerequisite:* CATAL 291, or equivalent. 3 hours or ¾ unit. May be repeated as topics vary to a maximum of 6 hours or 1½ units.

Italian (ITAL)

101. Elementary Italian
4 hours. For students who have no credit in Italian.

102. Elementary Italian
Continuation of ITAL 101. *Prerequisite:* ITAL 101 or one year of high school Italian. 4 hours.

103. Intermediate Italian
Rapid reading, review of grammar, composition, and conversation. *Prerequisite:* ITAL 102 or two years of high school Italian. 4 hours.

104. Intermediate Italian
Continuation of ITAL 103. *Prerequisite:* ITAL 103 or three years of high school Italian. 4 hours.

191. Freshman Honors Tutorial
Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once to a maximum of 6 hours.

199. Undergraduate Open Seminar
1 to 5 hours. May be repeated.

200. Introduction to the Study of Italian Literature
Emphasis on methodology for critical analysis of literary texts and on major periods and movements in their cultural and historical contexts. *Prerequisite:* ITAL 104 or consent of instructor. 3 hours.

208. Practical Review of Italian
Reviews major challenges in Italian grammar, with particular emphasis on the verb system (major tenses and moods, morphology, and aspect) and areas of contrast with English. *Prerequisite:* ITAL 104 or equivalent. 3 hours.

210. Advanced Grammar
Study of the structure of modern Italian in both its phonological and syntactic aspects for the student who already has a functional command of the language, with an emphasis on developing ability to analyze and interpret grammatical structures. *Prerequisite:* ITAL 208 or consent of instructor. 3 hours. (Counts for advanced hours in L A S.)

220. Conversation, I
Training in oral-aural skill and in writing. *Prerequisite:* Credit or concurrent registration in ITAL 208. 3 hours.

222. Conversation, II
Continuation of ITAL 220. *Prerequisite:* ITAL 220 or consent of instructor. 3 hours.

240. Italian Civilization of the Middle Ages and Renaissance
Same as C LIT 240. The development of Medieval Italian civilization in a literary context from the Sicilian School of love poetry to the early Renaissance in Florence; lectures and readings are in English. 3 hours.

280. Italian for Business and the Professions
Builds preexisting language skills through the study of Italian business practices: financial systems, transactions, banking, import/export and commercial correspondence. *Prerequisite:* ITAL 208 or equivalent. 3 hours. (Counts for advanced hours in L A S.)

290. Special Topics in Italian Studies
Selected substantive readings for independent study on a given special topic of Italian literature, culture, language, or linguistics. *Prerequisite:*

uisite: ITAL 104 and consent of instructor. 2 to 4 hours. May be repeated. (Counts for advanced hours in L.A.S.)

291. Honors Senior Thesis

For candidates for honors in Italian. 2 hours. May be repeated. (Counts for advanced hours in L.A.S.)

300. Italian for Speakers of Romance Languages

Accelerated language learning course designed for speakers of Romance languages. The focus will be primarily on those linguistics structures specific to Italian which differ significantly from equivalents in other Romance languages. Early emphasis on production skills; comprehension-based skills will be introduced in rapid succession. Intended for students who have no credit in Italian. *Prerequisite:* Native or near-native proficiency in a Romance language (SPAN, FR, PORT, or RMLNG.) 3 hours or ¾ unit.

302. Composition and Stylistics

Refinement of written discourse for academic and professional expectations and requirements. In addition to quizzes and a final examination, a major, formal paper on an assigned topic will be required. *Prerequisite:* ITAL 210 or equivalent; or consent of instructor. 3 hours or ¾ unit.

306. Italian Culture

Introduction to factors that have shaped present-day Italy; basic concepts contributing to understanding its present social and cultural development; taught in Italian. *Prerequisite:* ITAL 200 or 220, or consent of instructor. 3 hours or ¾ unit.

313. Dante

Same as C LIT 313. Interpretation of Dante's *Divine Comedy* with special attention to its position in the medieval world; a knowledge of Italian not required. 3 hours or ¾ unit.

314. Petrarch and Boccaccio: Literature of the Italian Middle Ages

Same as C LIT 314. Studies in Petrarch and Boccaccio; nonmajors in Italian may read the works in translation; lectures are in English. *Prerequisite:* Fulfillment of campus rhetoric requirement. 3 hours or ¾ unit.

320. Masterpieces of Italian Renaissance Literature

Same as C LIT 320. Reading of masterpieces of the 1400 and 1500s and a study of their predecessors and influence; nonconcentrators in Italian may read the works in translation; lectures are in English. Content rotates. *Prerequisite:* Fulfillment of campus rhetoric requirement. 3 hours or ¾ unit. May be repeated to a maximum of 6 hours or 1½ units with consent of instructor.

330. From Baroque to Romanticism

Major literary developments in Italy from the end of the Renaissance to the New Italy of the Risorgimento (Baroque, Arcadia, Enlightenment, Neoclassicism, Romanticism). *Prerequisite:* ITAL 200 or consent of instructor. 3 hours or ¾ unit.

340. Modern Italian Novel

Appreciation of the modern Italian novel through a close reading of some representative works (e.g., Verga, Moravia, Vittorini, Pavese). *Prerequisite:* ITAL 200 or consent of instructor. 3 hours or ¾ unit.

342. Modern Italian Poetry

Appreciation of modern Italian poetry through a close reading of some representative works (e.g., D'Annunzio, Pascoli, Montale, Quasimodo, Saba, Ungaretti, Novissimi, Zanzotto). *Prerequisite:* ITAL 200 or consent of instructor. 3 hours or ¾ unit.

350. Italian Syntax and Phonology

Introduction to the essential syntactic and phonological structures of Modern Standard Italian in combination with appropriate discussion of corresponding linguistic concepts. *Prerequisite:* ITAL 210 and 302, or consent of instructor. 3 hours or ¾ unit.

360. Principles of Language Testing

Same as E I L, FR, GER, SPAN, and PORT 360. See E I L 360.

362. Introduction to Romance Linguistics

Same as FR, LING, PORT, RMLNG, and SPAN 362. See SPAN 362.

380. Classroom Language Acquisition

Same as E I L, FR, GER, PORT, and SPAN 380. See SPAN 380.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E I L, FR, GER, HUMAN, PORT, SLAV, and SPAN 382, and LING 386. See HUMAN 382.

389. Theoretical Foundations of Second Language Acquisition

Same as FR 381, and E I L, GER, LING, PORT, and SPAN 389. See E I L 389.

462. Seminar in Romance Linguistics

Same as FR, LING, PORT, RMLNG, and SPAN 462. See SPAN 462.

463. College Teaching of Foreign Languages

Same as E I L, FR, GER, PORT, RUSS, and SPAN 463. See FR 463.

471. Proseminar in Foreign Language Teaching

Same as SPAN and PORT 471. See SPAN 471.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as E I L, FR, GER, PORT, RUSS, and SPAN 481. See FR 481.

487. Pragmatics and Cross-Cultural Communication

Same as E I L 456, and PORT and SPAN 487. See E I L 456.

488. Seminar in Second Language Learning

Same as GER, PORT, and SPAN 488. See SPAN 488.

495. Special Topics in Italian

Independent study/research under the direction of a faculty member. May or may not fulfill requirements for a particular degree program in Spanish, Italian, and Portuguese. Consult graduate adviser. ¼ to 1 unit. May be repeated in same or subsequent semesters to a maximum of 2 units.

499. Thesis Research

0 to 4 units.

Portuguese (PORT)

101. Elementary Portuguese, I

For students who have no credit in Portuguese. 4 hours.

102. Elementary Portuguese, II

Continuation of PORT 101. *Prerequisite:* PORT 101. 4 hours.

103. Intermediate Portuguese

Rapid reading, review of grammar, composition, and conversation. *Prerequisite:* PORT 102 or two years of high school Portuguese. 4 hours.

104. Intermediate Portuguese

Continuation of PORT 103. *Prerequisite:* PORT 103 or three years of high school Portuguese. 4 hours.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once to a maximum of 6 hours. Open only to honors majors or to Cohn Scholars and Associates.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

200. Advanced Grammar

The study of the structure of modern Portuguese in both its phonological and syntactic aspects for the student who already has a functional command of the language, with emphasis on developing ability to analyze and interpret grammatical structures. *Prerequisite:* PORT 104 or consent of instructor. 3 hours.

210. Composition and Conversation, I

Prerequisite: PORT 104 or consent of instructor. 3 hours.

212. Composition and Conversation, II

Prerequisite: PORT 210 or consent of instructor. 3 hours.

220. Readings in Portuguese

Readings and discussion in Portuguese of a variety of texts by leading Luso-Brazilian writers covering various genres and themes. Designed to emphasize reading skills and discussion, rather than literary criticism. *Prerequisite:* PORT 104 or equivalent. 3 hours.

234. Brazilian Women's Words in Translation

Same as W S 234. Study of gender, race, and class in Brazil through the study of these issues as documented by women's voices. Beginning with an analysis of the early representation of

women during the Portuguese colonization of the new world up to the present through translations of contemporary literature written by women. Class is writing intensive and requires no knowledge of Portuguese language. 3 hours.

300. Intensive Portuguese for Speakers of Romance Languages

Accelerated language learning course designed for speakers of Romance languages. Focus will be primarily on those linguistics structures specific to Portuguese which differ significantly from equivalents in other Romance languages. Early emphasis on production skills; comprehension-based skills will be introduced in rapid succession. *Prerequisite:* Native or near-native proficiency in a Romance language (Spanish, French, Italian, or Rumanian). 3 hours or $\frac{3}{4}$ unit. Credit is not given for both PORT 300 and PORT 101 and 102.

304. Luso-Brazilian Culture

Affords a broad understanding of the origins of Luso-Brazilian civilization and culture. *Prerequisite:* PORT 212 and 220, or equivalent. 3 hours, or $\frac{1}{2}$ or 1 unit.

306. Brazilian Film

Study of the evolution of Brazilian cinema through selected films to explore the nature and development of contemporary Brazilian aesthetics. *Prerequisite:* PORT 210 or 212; PORT 220 recommended. 3 hours or $\frac{3}{4}$ unit.

310. Studies in Brazilian Literature

Prerequisite: Consent of instructor. 3 hours or $\frac{3}{4}$ unit. May be repeated as topic varies to a maximum of 6 hours or $1\frac{1}{2}$ units.

320. Studies in Portuguese Literature

Prerequisite: Consent of instructor. 3 hours or $\frac{3}{4}$ unit. May be repeated as topic varies to a maximum of 6 hours or $1\frac{1}{2}$ units.

360. Principles of Language Testing

Same as E I L, FR, GER, ITAL, and SPAN 360. See E I L 360.

362. Introduction to Romance Linguistics

Same as FR, ITAL, LING, RMLNG, and SPAN 362. See SPAN 362.

380. Classroom Language Acquisition

Same as E I L, FR, GER, ITAL, and SPAN 380. See SPAN 380.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E I L, FR, GER, HUMAN, ITAL, SLAV, and SPAN 382, and LING 386. See HUMAN 382.

389. Theoretical Foundations of Second Language Acquisition

Same as FR 381, and E I L, GER, ITAL, LING, and SPAN 389. See E I L 389.

410. Seminar in Brazilian Literature

Advanced study of literary movements, major writers, and intellectual and cultural ideas in Brazilian literature; subject matter varies each time the course is offered. *Prerequisite:* PORT 310 or consent of instructor. 1 unit. May

be repeated for credit as topics vary to a maximum of 2 units.

462. Seminar in Romance Linguistics

Same as FR, ITAL, LING, RMLNG, and SPAN 462. See SPAN 462.

463. College Teaching of Foreign Languages

Same as E I L, FR, GER, ITAL, RUSS, and SPAN 463. See FR 463.

471. Proseminar in Foreign Language Teaching

Same as SPAN and ITAL 471. See SPAN 471.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as E I L, FR, GER, ITAL, RUSS, and SPAN 481. See FR 481.

487. Pragmatics and Cross-Cultural Communication

Same as E I L 456, and ITAL and SPAN 487. See E I L 456.

488. Seminar in Second Language Learning

Same as GER, ITAL, and SPAN 488. See SPAN 488.

495. Special Topics in Portuguese and Brazilian Literature

Independent study/research under the direction of a faculty member. May or may not fulfill requirements for a particular degree program in Spanish, Italian, and Portuguese. Consult graduate adviser. $\frac{1}{4}$ to 1 unit. May be repeated in same or subsequent semesters to a maximum of 2 units.

499. Thesis Research

0 to 4 units.

Romance Linguistics (RMLNG)

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

362. Introduction to Romance Linguistics

Same as FR, ITAL, LING, PORT and SPAN 362. See SPAN 362.

462. Seminar in Romance Linguistics

Same as FR, ITAL, LING, PORT and SPAN 462. See SPAN 462.

Spanish (SPAN)

101. Elementary Spanish

For students who have no university credit in Spanish. 4 hours.

102. Elementary Spanish

Continuation of SPAN 101. *Prerequisite:* SPAN 101 at the University of Illinois at Urbana-Champaign. All other second semester Spanish students should enroll in SPAN 122. 4 hours.

103. Intermediate Spanish

Continued development of reading, writing and conversational skills. Followed by SPAN 140, 160, or 180, this course fulfills the Liberal

Arts and Sciences foreign language requirement. *Prerequisite:* SPAN 102 or 122, or equivalent placement score. 4 hours. Credit is not given for both SPAN 103 and 125.

122. Elementary Spanish

Second-semester Spanish course for all students who did not take SPAN 101 at this University. *Prerequisite:* SPAN 101 elsewhere or assignment by placement exam. 4 hours.

125. Beginning Spanish for Heritage Speakers

Introduction to Spanish orthography, syntax, and vocabulary for students of Hispanic background who have had little or no formal training in the Spanish language. *Prerequisite:* Consent of instructor. 4 hours. SPAN 125 and 127, together, fulfill the LAS foreign language requirement.

127. Intermediate Spanish for Heritage Speakers

Review at the intermediate level of Spanish orthography, syntax, and vocabulary for students of Hispanic background who have little or no formal training in the Spanish language, and an introduction to the study of U.S. Hispanic minority literature. This course fulfills the Liberal Arts and Sciences foreign language requirement. *Prerequisite:* SPAN 125 or consent of instructor. 4 hours. Students may receive a total of 4 hours of credit for SPAN 127, 140, 160, and 180.

140. El Mundo Hispano-Americano

Introduction to *Las Américas Hispanas* (Mexico, Central and South America, and the Caribbean), their geography, cultures and language varieties. Taught entirely in Spanish, this course seeks to develop students' use of Spanish in an academic context. *Prerequisite:* SPAN 103 or equivalent. 4 hours. Recommended for students who plan to major or minor in Spanish. Students may receive a total of 4 hours of credit for SPAN 127, 140, 160, and 180.

160. Introduction to Spanish Grammar

Introduction to the major structures of Spanish, from a linguistic perspective. Taught entirely in Spanish, this course seeks to develop students' formal knowledge of Spanish grammar. *Prerequisite:* SPAN 103 or equivalent. 4 hours. Recommended for students who plan to major or minor in Spanish. Students may receive a total of 4 hours of credit for SPAN 127, 140, 160, and 180.

180. Intermediate Spanish for Business

Introduction to the lexicon, linguistic structures, and culture of business from a Hispanic perspective. The development of functional use of Spanish within the business context is the major focus of the course. *Prerequisite:* SPAN 103 or equivalent. 4 hours. Recommended for students who want to take SPAN 280. Students who plan to major or minor in Spanish should take SPAN 160 or 140. Students may receive a total of 4 hours of credit for SPAN 127, 140, 160, and 180.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:*

site: Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar
1-5 hours. May be repeated.

200. Readings in Hispanic Literature and Culture

Readings and discussion in Spanish of a variety of texts by leading Hispanic and Hispanic-American writers covering genres and themes; designed to emphasize reading, discussion, and enjoyment rather than literary criticism. Open to non-Spanish majors. *Prerequisite:* SPAN 140 or 160 or equivalent. 3 hours. Credit may be received by Advanced Placement "Language" or "Literature" examination. Does not count for credit toward the major.

202. The Chicano Experience

Same as LLS 202. Surveys literary work, film, essay, autobiography, historical narratives, and art in order to gain insight into the multifaceted nature of Chicano/Chicana identity and experience. Lecture and readings are in English. 3 hours. Does not count toward the major in Spanish.

210. Practical Review of Spanish

Review of major challenges in Spanish grammar, including the verb system (major tenses and moods, morphology, and aspect), areas of contrast with English, and some lexical/semantic issues. *Prerequisite:* SPAN 140 or 160 or equivalent. 3 hours.

212. Advanced Spanish Grammar

Intensive study and analysis of Spanish grammar including tense, aspect, and mood; morphological problems; syntactic variation; style in oral and written expression; brief discussion of dialectal variation. *Prerequisite:* SPAN 210; senior standing or consent of instructor. 3 hours. (Counts for advanced hours in L.A.S.)

214. Spanish Composition

Basic composition course; problems of written Spanish and principles of Spanish stylistic patterns; weekly written exercises. *Prerequisite:* SPAN 210 or consent of instructor. 3 hours.

216. Introduction to Spanish Phonetics

Practical, introductory course to Spanish phonetics, stressing practice in pronunciation. May be offered as intensive eight-week course. *Prerequisite:* SPAN 140 or 160 or equivalent. 2 hours.

220. Oral Spanish

Practice in speaking Spanish; to be taken concurrently with or subsequent to SPAN 210; meets four hours per week. *Prerequisite:* SPAN 140 or 160 or equivalent. 3 hours.

222. Intensive Spoken Spanish

Intensive oral contact with Spanish; meets four hours per week. *Prerequisite:* SPAN 220 or consent of instructor. 3 hours. May be repeated.

225. Introduction to the Study of Hispanic Literature, I

Introduction to the literatures of both Spain and Spanish America; emphasizes the major periods and movements in the light of

cultural, artistic, social, and historical contexts and the methodology for reading those texts through literary analysis appropriate for a variety of genres: novel, drama, poetry, short story, essay; focuses on literature written before 1700. *Prerequisite:* SPAN 200 (or advanced placement credit for 200) and SPAN 210. Concurrent enrollment in SPAN 214 strongly recommended. 3 hours. No advanced placement credit. SPAN 225 and 227 must be taken in sequence.

227. Introduction to the Study of Hispanic Literature, II

Introduction to the literatures of both Spain and Spanish America; emphasizes the major periods and movements in the light of cultural, artistic, social, and historical contexts and the methodology for reading those texts through literary analysis appropriate for a variety of genres: novel, drama, poetry, short story, essay; focuses on literature written after 1700. *Prerequisite:* SPAN 225; credit or concurrent registration in SPAN 214. 3 hours. No advanced placement credit. SPAN 225 and 227 must be taken in sequence.

230. Introduction to Translation

Theory and practice of written translations of nontechnical texts from English to Spanish and Spanish to English; brief study of concepts and objectives of translation; analysis of examples and exercises; term project in translation selected in consultation with instructor. *Prerequisite:* SPAN 210. 2 hours.

240. Culture of Spain

Survey of Spanish civilization from the beginning to present times. *Prerequisite:* SPAN 210 and 214, or consent of instructor. 3 hours. (Counts for advanced hours in L.A.S.)

242. Topics in U.S. Latina/Latino Literature

Same as LLS 242. Survey of literature by and about people of Mexican, Puerto Rican, and Cuban descent in the United States. Taught in English. 3 hours.

244. Hispanic Literature and Culture

Same as C LIT 244. Topics in major areas of Hispanic literature and culture; topics vary. Will count towards major only to satisfy culture requirement. Taught in English. 3 hours. May not be repeated more than twice for credit.

250. Spanish Literature, I: Major Works and Writers

Introduction to selected Medieval and Golden Age texts. *Prerequisite:* SPAN 214, 225, and 227. 3 hours. (Counts for advanced hours in L.A.S.)

252. Spanish Literature, II: Major Works and Writers

Introduction to selected texts from 1700 to the present. *Prerequisite:* SPAN 214, 225 and 227. 3 hours. (Counts for advanced hours in L.A.S.)

254. Spanish American Literature, I: Major Works and Writers

Study of major writers and representative works of Spanish American literature from Pre-Columbian times until 1875. *Prerequisite:* SPAN 214, 225, and 227. 3 hours. (Counts for advanced hours in L.A.S.)

256. Spanish American Literature, II: Major Works and Writers

Study of major writers and representative works of Spanish American literature from 1875 until the present. *Prerequisite:* SPAN 214, 225 and 227. 3 hours. (Counts for advanced hours in L.A.S.)

260. Introduction to Hispanic Linguistics

Introduction to Spanish phonology, syntax, sociolinguistics, dialectology, and history of the language; includes an overview and opportunity to examine an issue in each area in detail. *Prerequisite:* SPAN 210. 3 hours. (Counts for advanced hours in L.A.S.)

271. Introduction to Second Language Learning and Teaching

Same as FR, GER, HUMAN, LAT, and RUSS 271. Introduction to models of communication and communicative competence, contemporary approaches to language teaching, current research in second language acquisition, and issues and perspectives on languages testing. Includes 24 early field experiences in local schools. *Prerequisite:* Sophomore standing and enrollment in a teacher education curriculum, or consent of instructor. Early field experiences require Illinois State criminal background check (see Council on Teacher Education for questions). 4 hours.

275. Developing and Implementing Communicative Language Teaching

Same as FR, GER, LAT, and RUSS 275. Course focuses on the development of appropriate language teaching materials based on theory and research in classroom language learning. Emphasis is on skill development and testing as well as lesson planning. Includes 28 early field experiences in the form of microteachings and observations in local schools. *Prerequisite:* SPAN 271 and enrollment in a teacher education curriculum, or consent of instructor. 4 hours.

277. Spanish Grammar for Communicative Language Teaching

Survey of major Spanish syntactic and morphological patterns with particular emphasis on the acquisition of Spanish grammar by non-native speakers. Students will develop a sensitivity for appropriate teaching of Spanish grammar. *Prerequisite:* SPAN 271 or consent of instructor. 3 hours. Required for teacher education majors.

278. Current Issues in Secondary Language Teaching

Same as FR, GER, LAT, and RUSS 278. Course provides an overview of some day-to-day issues in contemporary language teaching in the secondary context. Topics include discipline and classroom management, organization, lesson planning, standards, technology, among others. Course meets for the first eight weeks of the spring semester and requires an eight-hour time block of time one day per week for on-site work in a secondary classroom setting for a total of 42 early field experiences. *Prerequisite:* Enrollment in a teacher education program and completion of SPAN 271 and 278. 4 hours.

280. Spanish for Industry and Commerce, I
Introduction to vocabulary of Hispanic commerce; composition of business letters and similar texts. *Prerequisite:* SPAN 180, or consent of instructor. 3 hours.

290. Advanced Readings in Spanish

Directed reading course intended to develop an advanced student's interest in a special area of Hispanic linguistics or literature (author, genre, period, group of works, etc.). Topics to be chosen in consultation with an adviser. Only topics not covered in regular offerings will be considered. *Prerequisite:* SPAN 260 for linguistics topics; and any two of SPAN 250, 252, 254, or 256 for literature topics. 1 to 3 hours. May be repeated for credit as topics vary. (Counts for advanced hours in L A S.)

291. Special Topics for Honors Students

For candidates for honors in Spanish; intensive study of topics in Hispanic literature or linguistics. *Prerequisite:* Consent of instructor and of departmental honors adviser. 1 to 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

299. Study Abroad

Lectures, discussions, seminars, and practical work in Spanish language, literature, history, culture, and civilization in Spain and Latin America. *Prerequisite:* SPAN 104 or equivalent. 0-18 hours. May be repeated to a maximum of 36 hours in separate semesters. (May count for advanced hours in L A S. Consult the departmental adviser for details.)

300. Introduction to Medieval Spanish Literature

Historical and cultural background for the Middle Ages; selected readings in medieval literature from the Jarchas to the Corbacho. *Prerequisite:* SPAN 250 or equivalent. 3 hours or ¾ unit.

302. Medieval Literature

In-depth study of selected major works of literature through 1550, surveying the principal currents of pertinent scholarship; special emphasis on the position of Spanish medieval literature in the broader context of European literature in both the Latin and the various vernacular languages. *Prerequisite:* SPAN 300. 3 hours or ¾ unit.

310. Literature of the Golden Age

Study of authors and genres of the Golden Age. *Prerequisite:* SPAN 250 or equivalent. 3 hours or ¾ unit.

314. Cervantes: *Don Quixote*

Introduction to *Don Quixote*, to its relationship to other selected masterpieces of the Golden Age, and to the main currents and forms of Golden Age prose. *Prerequisite:* SPAN 250 or equivalent. 3 hours or ¾ unit.

320. Neoclassicism, Romanticism, Realism

Study of representative authors and genres of the nineteenth century; particular emphasis on the neoclassical comedy, romantic drama and poetry, and the realistic novel. *Prerequisite:* SPAN 250 and 252 or equivalent. 3 hours or ¾ unit.

322. Spanish Literature from 1898 to 1939

Study of representative authors of the Generations of 1898 and 1927 with particular emphasis on literary experimentalism (symbolism, impressionism, surrealism, etc.) and the historical and ideological currents of the period as related to Spanish literature. *Prerequisite:* SPAN 252 or equivalent. 3 hours or ¾ unit.

324. Contemporary Spanish Literature

Study of the representative authors, genres, and literary modalities in the literature of Spain since the Spanish Civil War; particular emphasis on the neo-realist, existentialist (*tremendista*) novel, and the social novel and theatre, as well as on social and experimental trends in all genres since the mid-1960s and in the post-Franco era. *Prerequisite:* SPAN 252 or equivalent. 3 hours or ¾ unit.

330. Colonial Spanish American Literature

Intensive study of Colonial Spanish American literature from the chronicles through the literature of Emancipation; topics include the development of genres and their adaptations, presence of indigenous cultures, contrastive poetics, relationship of socioeconomic and literary development, and independence. *Prerequisite:* SPAN 254 or equivalent. 3 hours or ¾ unit.

340. Spanish-American Novel

Major movements and writers in the development of the Spanish-American novel from its beginnings to the present. *Prerequisite:* SPAN 254 and 256, or equivalent. 3 hours or ¾ unit.

342. Spanish-American Drama

Intensive and analytical study of the works of principal playwrights of the modern and contemporary periods in Spanish America. *Prerequisite:* SPAN 254 and 256, or equivalent. 3 hours or ¾ unit.

344. Spanish-American Short Story

Intensive and analytical study of the principal *cuentistas* of Spanish America. *Prerequisite:* SPAN 254 and 256, or equivalent. 3 hours or ¾ unit.

346. Spanish-American Poetry

Major poets and movements in the development of Spanish-American poetry from the Colonial Period to the present. *Prerequisite:* SPAN 254 and 256, or equivalent. 3 hours or ¾ unit.

352. Spanish Syntax

Systematic introduction to the foundations of Spanish syntax based on standard and more recent treatments of Spanish and syntactic theory. *Prerequisite:* SPAN 260 or consent of instructor. 3 hours or ¾ unit.

354. Spanish Phonology

Systematic introduction to the sound structures of Spanish, concentrating on recent contributions of theoretical linguistics to the understanding of the phonology of Spanish in its standard and selected dialectal varieties. *Prerequisite:* SPAN 350. 3 hours or ¾ unit.

360. Principles of Language Testing

Same as E I L, FR, GER, ITAL, and PORT 360. See E I L 360.

362. Introduction to Romance Linguistics

Same as FR, ITAL, LING, PORT, and RMLNG 362. Comparative and historical analysis of the Romance languages. *Prerequisite:* Four semesters of a Romance language or Latin, or equivalent; LING 200, SPAN 260, FR 316, or equivalent. 3 hours or ¾ unit.

364. History of the Spanish Language

3 hours or ¾ unit.

380. Classroom Language Acquisition

Same as E I L, FR, GER, ITAL, and PORT 380. Provides for an introduction to the context, process(es), and product of classroom language acquisition; emphasis is placed upon research, research findings, and implications of research. *Prerequisites:* HUMAN 279, LING 200, or equivalent, or consent of instructor. 3 hours or ¾ unit.

382. Computer-Based Foreign Language Teaching

Same as CLCIV, E I L, FR, GER, HUMAN, ITAL, PORT, and SLAV 382 and LING 386. See HUMAN 382.

389. Theoretical Foundations of Second Language Acquisition

Same as FR 381, and E I L, GER, ITAL, LING, and PORT 389. See E I L 389.

390. Topics in Hispanic Studies

Topical studies of Hispanic literature or linguistics beyond the scope of regular offerings at the 300-level. *Prerequisite:* Corresponding introductory course at the 300-level, or consent of instructor. 3 hours or ¾ unit. May be repeated as topics vary to a maximum of 9 hours or 2¼ units.

400. Beginning Spanish for Graduate Students

Basic grammar and vocabulary; reading practice. 4 hours. No graduate credit.

401. Readings in Spanish for Graduate Students

Continuation of SPAN 400; special readings in the critical literature of several disciplines. *Prerequisite:* SPAN 400 or consent of instructor. 4 hours. No graduate credit.

404. Seminar in Medieval Literature

Research work in medieval Spanish literature; theory and practice. Topics vary. *Prerequisite:* SPAN 300, 302, or equivalent. 1 unit. May be repeated for credit as topics vary to a maximum of 2 units.

410. Seminar in Golden Age Literature

Same as C LIT 404. *Prerequisite:* SPAN 310 or equivalent. 1 unit. May be repeated for credit as topics vary to a maximum of 2 units.

420. Seminar in Modern Spanish Literature

Study of problems in the works of a major writer or group of writers of the eighteenth or nineteenth centuries. *Prerequisite:* SPAN 320. 1 unit. May be repeated for credit as topics vary for a maximum of 2 units.

422. Seminar in Twentieth-Century Spanish Literature

Investigation of literary problems presented by the Spanish novel, drama, poetry and/or essay since 1900. *Prerequisite:* SPAN 324 or equivalent. 1 unit. May be repeated for credit as topics vary to a maximum of 2 units.

432. Seminar in Spanish-American Poetry

Prerequisite: SPAN 346 or equivalent. 1 unit. May be repeated for credit as topics vary to a maximum of 2 units.

440. Seminar in the History of Ideas

Major topics in Hispanic intellectual history; sample topics include *El ensayo como Genero instrumental de las ideas*, *El peso de la identidad cultural*, *Corrientes ideologicas coloniales*, and *Idealismo y realismo*. 1 unit. May be repeated for credit as topics vary to a maximum of 2 units.

442. Seminar in Special Topics of Hispanic Literature

Selected topics in Hispanic literature not previously covered in existing courses. 1 unit. May be repeated for credit as topics vary to a maximum of 4 units.

450. Seminar in Spanish Synchronic Linguistics

Selected topics of Spanish phonology, syntax and sociolinguistics in the light of present-day linguistic theory. *Prerequisite:* Graduate standing in Spanish or consent of instructor. 1 unit. May be repeated for credit as topics vary to a maximum of 4 units.

452. Seminar in Spanish Diachronic Linguistics

Selected topics on the development of Spanish and its dialects in the light of present-day historical methods. *Prerequisite:* Consent of instructor. 1 unit. May be repeated for credit as topics vary to a maximum of 2 units.

462. Seminar in Romance Linguistics

Same as FR, ITAL, LING, PORT, and RMLNG 462. Selected topics in comparative Romance linguistics. *Prerequisite:* SPAN 362 and consent of instructor. 1 unit. May be repeated as topics vary.

463. College Teaching of Foreign Languages

Same as E I L, FR, GER, ITAL, and PORT, and RUSS 463. See FR 463.

471. Proseminar in Foreign Language Teaching

Same as ITAL and PORT 471. In-depth exploration of fundamental concepts in foreign language teaching; designed for departmental Teaching Assistants; topics include classroom discourse, teaching approaches, reading, listening, writing, and principles of language testing. *Prerequisite:* Teaching assistantship in the Department of SPAN, ITAL, and PORT, or consent of instructor. 1 unit.

481. Seminar in Linguistic and Psychological Foundations of Language Teaching

Same as E I L, FR, GER, ITAL, PORT, and RUSS 481. See FR 481.

487. Pragmatics and Cross-cultural Communication

Same as ITAL and SPAN 487, and E I L 456. See E I L 456.

488. Seminar in Second Language Learning

Same as GER, ITAL, and PORT 488. Treats specific topics in second language learning that are of current research and/or theoretical interest. Topics vary from semester to semester. *Prerequisite:* SPAN 380 or equivalent or consent of instructor. 1 unit. May be repeated as topics vary to a maximum of 4 units.

495. Special Topics in Spanish

Independent study/research under the direction of a faculty member. May or may not fulfill requirements for a particular degree program in SPAN, ITAL and PORT. Consult graduate adviser. $\frac{1}{4}$ to 1 unit. May be repeated in same or subsequent semesters to a maximum of 2 units.

499. Thesis Research

0 to 4 units.

SPECIAL EDUCATION

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Special Education (SP ED)

117. Exceptional Children

Introduction to the study of children who are different than the average in mental, physical, and social characteristics, including a study of the characteristics of such children and the adaptation of educational procedures to their abilities and disabilities. *Prerequisite:* Sophomore standing or PSYCH 100. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

205. Introduction to Serving Students with Special Needs

Topics include the history of services for students with special needs, the legal bases for special education, the characteristics of students with special needs, the referral process for students who may be eligible for special services, and the nature of learning disabilities. 1 hour.

249. Independent Study

Study of problems not considered in other courses; designed for students who excel in self-direction and intellectual curiosity. *Prerequisite:* Upperclassman; upper five percent of class in GPA; demonstrated writing competence, research potential, scholarly attitude, and interest as attested to by instructors; consent of adviser and staff member who supervises the work. 2 hours.

260. American Sign Language

Same as LING, PSYCH and SPSHS 260. Beginning course in American Sign Language (ASL), the language developed and used by the deaf community of North America; consists of a preparatory phase to attune students to communication in the manual-visual mode, followed by instruction and extensive practice in basic sign vocabulary, sentence structure, elementary conversation, and the literature of the ASL community. 3 hours.

291. Thesis

Prerequisite: Senior standing. 2 hours.

292. Thesis

Prerequisite: Senior standing. 2 hours.

305. Teaching Students with Special Needs in the Regular Classroom

Examination of issues in educating students with special needs: service delivery models, roles of teachers and related service providers, student assessment, curriculum individualization, instructional strategies, management of problem behaviors, and program evaluation. *Prerequisite:* SP ED 205 or consent of instructor. 2 hours or $\frac{1}{2}$ unit. Concurrent enrollment in ED PR 232 or consent of instructor. Students may not receive credit for both this course and SP ED 308.

308. Teaching Students with Learning and Behavior Problems in the Regular Classroom

Examination of the role of the general classroom teacher in educating students with learning and behavior problems. Topics include: identifying and describing learning and behavior problems, classroom behavior management techniques, remediation of academic skill deficits, and measuring and evaluating pupil progress. 3 hours or 1 unit.

314. Applications in Assessment of Young Children with Special Needs

Practice in designing and applying assessment devices and procedures and in using them to make educational decisions for children with special needs, birth through kindergarten age. *Prerequisite:* Credit or concurrent registration in SP ED 424 or consent of instructor. 2 or 4 hours, or $\frac{1}{2}$ or 1 unit. Students will be required to complete an extensive field based component in order to receive 4 hours or 1 unit credit.

316. The Gifted Child in School and Society

Consideration of persons in society exhibiting gifted behavior; who they are, their physical, psychological, social, and educational characteristics, and society's needs and provisions for them. The major portion of the course is devoted to the consideration and evaluation of instructional and administrative adjustments that should be made for the gifted in the educational structure. *Prerequisite:* EDPsy 211 or 236. 3 hours, or $\frac{1}{2}$ to 1 unit.

322. Introduction to Mental Retardation

Same as PSYCH, REHAB, and SOC W 322. Study of the history and current status of the social, emotional, physical, and learning characteristics and problems of persons with men-

tal retardation; identification and diagnosis; available services and provisions; and educational programs and lifelong processes of adaptation for these individuals and their families. *Prerequisite:* PSYCH 100 or SP ED 117; or equivalent. 3 hours, or ½ or 1 unit.

324. Tests and Measurements in Special Education

Interpretation of norm- and criterion-referenced tests for special populations including their reliability and validity; selection and design of observation systems; application of measurement and other assessment data to make instructional decisions for children and young adults with disabilities. 2 hours or ½ unit.

332. Characteristics and Methods of Educating Students with Multiple Disabilities

Focuses upon the physical and educational characteristics of individuals with multiple disabilities, particularly those with physical disabilities and other health and sensory impairments; covers educational curricula, teaching methods, and other educational considerations such as working with parents, medical personnel, and support staff, and educational adaptations. 3 hours or 1 unit.

335. Behavior Analysis for Teachers:

Applications with Exceptional Individuals
Remediation of behavior problems of exceptional students and adults using applied behavior analysis techniques; includes defining, observing, recording, charting, and evaluating behavior change and application of behavioral procedures to remediate behavior problems in the classroom. 3 hours, or ½ or 1 unit.

336. Systematic Instruction for Students with Special Needs

Elements of data-based instruction emphasizing educational planning for individuals with special needs; includes task and developmental analysis, writing instructional programs, and individualization of instruction. Covers infancy to young adults; mild to severe disabilities. *Prerequisite:* Credit or concurrent registration in SP ED 335, or consent of instructor. 4 hours or 1 unit.

337. Curriculum Development and Classroom Organization for Students with Moderate and Severe Handicaps

Curriculum design, development, and adaptation for students with moderate and severe disabilities; includes the following basic curriculum areas: domestic/home living, self-care, socialization, community living, leisure and recreation, and functional academics; a focus is on providing instruction in these areas in inclusive educational settings; and an emphasis throughout the course is on the evaluation of curriculum and program effectiveness. *Prerequisite:* SP ED 336. 4 hours or 1 unit.

338. Families of Children with Special Needs

The impact of children with special needs on their families; models for the study of family systems are applied to understanding families of children with special needs; emphasis on

planning family-focused interventions and exploring strategies for working with parents in a variety of settings. *Prerequisite:* Practicum experience or consent of instructor. 3 hours, or ½ or 1 unit.

345. Transition Planning and Vocational Training for Individuals with Disabilities

Same as REHAB and HRE 345. Provides an orientation to transition planning and vocational training as integrated components of secondary-level education curriculum. Topics include transition planning practices and participants, vocational assessment methods, supported employment concepts and issues, and vocational training strategies and programs. *Prerequisite:* Credit or concurrent registration in SP ED 335, or consent of instructor. 3 hours or 1 unit.

350. Introduction to Early Childhood Special Education

Overview of the history, trends, and issues of the field of Early Childhood Special Education with particular attention to federal and state policy, service system models, and professional roles and ethics. Emphasis is on current research, theory, and practice. *Prerequisite:* Junior standing. 2 hours or ½ unit.

359. Workshop and Laboratory in Curriculum and Methodology

Intensive exploration of curriculum development in specialized areas of education. Requests for initiation of course sections are made by faculty or students. 2 or 4 hours, or ½ or 1 unit.

360. Communications Strategies for Persons with Severe Intellectual and/or Physical Disabilities

Focuses upon issues and intervention strategies that can impact the communication skills of persons with moderate or severe intellectual and/or physical disabilities. Specific assessment and intervention strategies are discussed as they relate to both verbal and augmentative communication. 4 hours, or ½ or 1 unit.

365. Intervention Issues and Practices with Young Children with Disabilities

Introduction to the field of early childhood special education, including its history and major issues; instructional methods used in teaching and facilitating development in young children with disabilities are covered in depth. *Prerequisite:* Concurrent registration in SP ED 424 or consent of instructor. 3 hours, or ½ or 1 unit.

385. Development of Individual Differences in Children from Birth to Six Years of Age

Examines major developmental themes in young children from birth to six. Emphasizes individual differences resulting from environmental and biological factors that influence development, including those resulting from disabilities. Focuses on integration among multiple domains of development. *Prerequisite:* Graduate standing or consent of instructor. 3 hours, or ½ or 1 unit.

410. Legal Aspects of Disabilities

Study of the legal rights of individuals with disabilities and their families, with emphasis on educational aspects; interrelationship of constitutional, statute, administrative, and case law at the federal, state, and local levels. Case study simulations and mock due process hearings are included. 1 unit.

411. Drugs in Special Education

General survey of psychoactive drugs used extensively with children in special education, including reasons for the prescription, behavioral effects as observed in the classroom, effects on the child's behavior at home, issues concerning the use of the drugs, and litigation about these issues. 1 unit.

417. Programs for Students with Special Needs

Introduction to special education: characteristics, assessment, and teaching methodology for students with learning and other disabilities; methodology is directed to the regular classroom teacher of students with special needs. *Prerequisite:* Provisional teaching certification or completion of student teaching; or consent of instructor. 1 unit.

420. The Social Psychology of Persons with Disabilities

Same as REHAB 420. See REHAB 420.

421. Administration and Supervision of Special Education

Examination of administrative and supervisory practices in educating children with disabilities and gifted children in public and private schools; application of administrative theory to special education programs. Designed for graduate students in education administration or special education preparing to direct special education programs. *Prerequisite:* SP ED 417; EOL 450; or consent of instructor. 1 unit.

422. Theories of Academic Remediation

Examination of the major theoretical approaches in the areas of mild disabilities and their critical evaluation in light of research. Topics include: assessment and remediation strategies, critical evaluation of research, and issues in mild disabilities. 1 unit.

424. Supervised Practice in Special Education

Supervised practice in one or more settings in which students with mild to severe disabilities are served; practicum settings may include day, residential, special, and regular schools which serve students with disabilities. *Prerequisite:* Admission to the graduate program in special education; consent of supervising faculty member. ½ to 2 units.

425. Principles and Practices of Collaborative Resource Teaching

Focuses on effective instructional practices for teachers of students with mild learning and behavior problems. Trains teachers in direct service delivery models for collaborative resource teaching. 1 unit.

426. Theories and Practice of Collaboration for Special Educators

Focuses on aspects of collaborative resource and consultant teacher services that go beyond direct instruction services; emphasis on training resource room teachers to work as collaborative consultants to regular classroom teachers, parents, and paraprofessionals. 1 unit.

438. Interdisciplinary Team Approaches to Planning and Intervention for Children with Special Needs

Study of roles and functions of teams in early intervention and special education service delivery; considers models of team process within and between service settings; explores dynamics of interaction on teams, including approaches to decision-making, communication, and conflict resolution; examines professional roles and tasks of team members in the intervention process. *Prerequisite:* Practicum experience or consent of instructor. ½ or 1 unit.

449. Independent Study

Self-directive, independent study, that is, develops the individual's ability as an independent student and enables the student to pursue needed study in a field in which appropriate courses are not being offered during a given semester. *Prerequisite:* Approval of study outline by adviser and the department head prior to enrollment. ½ or 1 unit. May be repeated for credit with consent of adviser and department head.

450. Methods of Educational Inquiry

Same as C & I and EDPSY 450. See C & I 450.

456. Problems and Trends in Special Education

Introduction to significant problems, points of view, and trends in the field concerned; explores significant research related to organization, content, and techniques in the field in question. Students are encouraged to design/propose/conduct special studies in approved areas. 1 to 2 units.

465. Development and Characteristics of Young Children with Special Needs

Examines characteristics of children with major biological risk conditions and disabilities, birth to six, with a focus on the impact of these conditions on development; briefly examines interventions used by a variety of professionals in addressing specific developmental needs of children with a variety of disabilities. *Prerequisite:* EDPSY 236 or equivalent. ½ or 1 unit.

466. Early Childhood Special Education: Organizing for Early Intervention

Program issues and research on the efficacy of various program models for young children with special needs from infancy to six; implications for program organization variables such as space, personnel roles, and curriculum. *Prerequisite:* SP ED 365, and concurrent enrollment in SP ED 424 or consent of instructor. ½ or 1 unit.

483. Single Subject Research Design

Same as EDPSY 483. Study of the analysis of behavior in one or a few subjects using ad-

vanced time series designs; includes making accurate and reliable assessment of objective behaviors and designing experiments that feature interpretable comparisons among interventions and credible generalizability to subjects, settings, and time periods other than those specifically studied. Classic and current exemplars of these designs are studied and critiqued in depth. 1 unit.

490. Seminar for Advanced Students of Education

Seminar in the education of individuals with special needs; open only to persons who have been admitted for doctoral study. Sections may be offered in the following fields: (d) program planning and orientation and (t) teacher education. 0 to 2 units.

491. Field Study and Thesis Seminar

Planning field studies and thesis problems by doctoral candidates; students present their studies at each of four stages: (1) the inception, delimitation, tentative design stage; (2) the proposed design stage; (3) the revised design stage; and (4) the final design stage. Students are expected to analyze all presentations critically. 1 to 2 units. Limited to students who have been admitted for doctoral study.

492. Concepts and Issues in Special Education, I

Roles and competencies for special education leadership positions; includes literature critique, and preparation and presentation of a major review paper in an area of research interest. *Prerequisite:* Admission to doctoral studies in special education, or consent of instructor. 1 unit.

493. Concepts and Issues in Special Education, II

Seminar in current concepts and issues relating to all children with special needs; introduction to grant proposal writing; and introduction to journal reviewing; requires critical review of key readings and preparation of a literature review of a topic of current research in special education. *Prerequisite:* SP ED 492 or consent of instructor. 1 unit.

499. Thesis Research

Individual direction of research and thesis writing. 0 to 4 units.

SPEECH AND HEARING SCIENCE

Head of Department: Peter J. Alfonso
Department Office: 901 South Sixth Street, Champaign
Phone: 333-2230
URL: www.shs.uiuc.edu

Speech and Hearing Science (SPSHS)**102. Human Communication: Systems, Processes, and Disorders**

Examines broad perspectives of theories and information regarding normal and abnormal communication: how speech and language develop, how people hear, how they produce speech and what can go wrong; addresses the impact of speech and hearing science on society, culture, and modern technologies. 3 hours.

198. Freshman Seminar

Special experimental seminar or independent study course intended to cover topics not treated by regular course offerings; open to undergraduates at any level. Requests for activation of this course may be made by students or by faculty and should be directed to the head of the academic department concerned. While credit toward graduation is normally granted, credit toward satisfying specific college or departmental requirements is contingent upon approval by the appropriate college or departmental committee. 0 to 9 hours. May be repeated.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. General Phonetics

Same as SPCOM 201. Basic principles of phonetic study; includes observation and representation of pronunciation, ear training, and practice in transcription. 3 hours.

260. American Sign Language

Same as LING, PSYCH, and SP ED 260. See SP ED 260.

290. Individual Study

Individual investigation of special problems. *Prerequisite:* Ten hours of speech and hearing science, and written approval by the faculty members who will supervise the student's work. 2 to 4 hours. May be repeated to a maximum of 6 hours.

291. Honors Course

Individual study leading either to a thesis or to departmental honors. *Prerequisite:* Senior standing; a cumulative grade point of 3.5 or consent of the head of the department. 2 hours. May be repeated to a maximum of 4 hours.

302. Manual Communication, I

Study of methods of manual communication with hearing impaired individuals; analysis of the language of signs and finger spelling in relation to origins, development, and structure; and extensive practice in manual communication. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

375. Speech Science, I

Same as SPCOM and LING 375. Introduction to the anatomic and physiologic characteristics of the normal speech and hearing mechanisms. 4 hours or 1 unit.

376. Speech Science, II

Same as SPCOM and LING 376. Consideration of the physiology of the speaking act, the acoustical characteristics of voice and of

speech sounds, and the hearing of speech. *Prerequisite:* Consent of instructor. 4 hours or 1 unit.

378. Hearing Science

Acoustics, anatomy, and physiology of the auditory system; psychophysical methods; and a consideration of auditory theories and mechanics. *Prerequisite:* Consent of instructor. 3 hours or ½ unit.

383. Development of Spoken Language

Same as SPCOM 383. Study of the correlates of language development from the prelinguistic period to adulthood. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

384. Introduction to Stuttering

Study of the theoretical and research literature concerning the causes, diagnosis, and treatment of stuttering and an analysis of clinical procedures in stuttering therapy. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

385. Speech Pathology, I

Study of the symptoms, causes, and treatment of articulation disorders. *Prerequisite:* Consent of instructor. 3 hours or ½ unit.

386. Language Disorders in Children

Definition, etiology, and description of various types of language disorders in children; assessment and intervention of these clinical cases. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

388. Speech Pathology, II

Study of the symptoms, causes, and treatment of voice disorders. *Prerequisite:* SPSHS 385 or consent of instructor. 3 hours, or ½ or 1 unit.

389. Appraisal in Speech Pathology

Introduction to principles of diagnosis; discussion of administration, scoring, and interpretation of tests utilized during speech and language evaluation. *Prerequisite:* SPSHS 383 and 385, or consent of instructor. 3 hours or ½ unit.

390. Introduction to Hearing Disorders and Audiometry

Review of the history of audiology as a profession; study of symptoms, causes, and treatment of hearing losses; and principles and application of basic audiometry. 4 hours or 1 unit.

393. Aural Habilitation and Rehabilitation

Principles and methods of clinical and classroom retraining of the hard-of-hearing; includes lip reading, auditory training, speech disorders and conservation, and counseling. Required in curriculum of teacher training in speech and hearing science. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

399. Quantitative Reasoning in Speech and Hearing Science

Introduction to experimental designs and methods of statistical analysis in speech and hearing research. *Prerequisite:* Graduate standing or consent of instructor. 3 hours, or ½ or 1 unit.

400. Experimental Phonetics I: Speech Physiology

Same as LING 475. Theoretical consideration of speech as motor behavior; special reference to physiological investigations of normal respiration, phonation, and supralaryngeal articulation; and survey of the experimental literature in articulatory phonetics. *Prerequisite:* Consent of instructor. 1 unit.

401. Experimental Phonetics II: Speech Acoustics and Perception

Same as LING 476. Theoretical consideration of speech as an acoustical phenomenon; special reference to acoustical investigations of the laryngeal source and radiated speech signal; and survey of the experimental literature in acoustic phonetics and speech perception. *Prerequisite:* Consent of instructor. 1 unit.

410. Seminar in Stuttering

Advanced study of stuttering disorders; topics vary, but emphasis is placed on measurement, clinical evaluation, and therapeutic methods. *Prerequisite:* A course in stuttering. 1 unit.

411. Development and Disorders of Phonology and Articulation

Survey of basic knowledge concerning normal and deviant phonological development, and principles for applying this knowledge to the assessment and remediation of phonological disorders. *Prerequisite:* Consent of instructor. 1 unit.

413. Voice Disorders and Alaryngeal Speech

Advanced study and critical analysis of the literature pertaining to anatomic, physiologic, acoustic, and psychological bases of voice pathology and laryngectomy. Includes methods of diagnosis and treatment. *Prerequisite:* SPSHS 375, 376, 388 or equivalent or consent of instructor. 1 unit.

414. Orofacial Anomalies

Evaluation of current theories and intervention research associated with cleft palate and orofacial anomalies. Advanced study and critical analysis of speech, dental, and surgical treatment procedures. *Prerequisite:* SPSHS 375, 376 or equivalent or consent of instructor. 1 unit.

415. Normal and Disordered Swallowing

Study of the anatomy, physiology, and pathophysiology of the oral and pharyngeal stages of swallowing and critical review of the research literature pertaining to methods for diagnosis and treatment of dysphagia. *Prerequisite:* SPSHS 375 or equivalent and SPSHS 472, or consent of instructor. 1 unit.

416. Motor Speech Disorders

Study of the etiology and symptomatology of pediatric and adult speech problems resulting from neurological impairment, and critical review of the research literature pertaining to methods for assessment and treatment of these disorders. *Prerequisite:* SPSHS 375 or equivalent and SPSHS 472, or consent of instructor. 1 unit.

420. Language Science

Study of recent research and theory in neurolinguistics, psycholinguistics, and sociolinguistics. Intensive examination of data collection and analysis procedures in language acquisition, and interpretation of research results relative to different age groups. Implications for clinical practice and clinical research in language disorders are addressed. *Prerequisite:* SPSHS 383 or equivalent, or consent of instructor. 1 unit.

430. Language Disorders in Preschool Children

Advanced study of early language milestones, processes, and theories; examination of the nature and character of disordered language acquisition in preschool children, and evaluation of current theory and intervention research in the area. *Prerequisite:* SPSHS 383 or equivalent, or consent of instructor. 1 unit.

431. Language Disorders in School-Age Children

Advanced study of the nature of language impairments and language/learning disabilities found in the school-age population, and ramifications for academic success and social development; critical review of theoretical models and empirical evidence of language learning in older children; evaluation of research in the diagnosis and treatment of language impairments in older children. *Prerequisite:* SPSHS 383 or equivalent, or consent of instructor. 1 unit.

432. Aphasia and Related Disorders

Advanced study of the communication disorders resulting from neurological impairments in adults: critical analysis of the research literature, examination of current theories regarding aphasia and related disorders; evaluation of existing paradigms of diagnosis and intervention. *Prerequisite:* SPSHS 472 or consent of instructor. 1 unit.

435. Advanced Language Diagnostics

Advanced study of the diagnosis of language disorders in children from infancy through adolescence; particular emphasis on critical evaluation of current methods in assessment, the development of problem-solving skills, and the application of computer technology in language analysis. *Prerequisite:* SPSHS 389 and 420 or equivalent, or consent of instructor. 1 unit.

436. Speech and Language Clinical Methods in the Schools

Study of methods and materials used in the schools by the speech and language clinician. *Prerequisite:* SPSHS 388. ½ unit.

440. Psychoacoustics

Advanced study of physical nature of sound and its measurement; theory and practice of psychophysics, including the various aspects of psychoacoustics (sensitivity, masking, loudness, pitch, binaural hearing, speech perception) and the nonlinear nature of the auditory system. *Prerequisite:* SPSHS 378 or equivalent. 1 unit.

450. Assessment of Audition and Auditory Disorders

Study of technical and clinical aspects of audiological assessment and auditory disorders; critical analysis of clinical and experimental literature; laboratory experience in audiological assessment techniques. *Prerequisite:* SPSHS 378, 390, or equivalent or consent of instructor. 1 unit.

451. Electrophysiologic Indices of Audition and Balance

Study of technical and clinical aspects of electrophysiologic measures of audition and balance; critical analysis of clinical and experimental literature; laboratory experience in electrophysiologic techniques. *Prerequisite:* SPSHS 378, 390, 450 or equivalent or consent of instructor. 1 unit.

452. Diagnosis of Hearing Impairments in Infants and Young Children

Study of the major etiologies underlying hearing impairments encountered in the pediatric population, program models for infants and young children at risk for hearing impairment, behavioral and physiologic issues in assessment and evaluation of residual hearing, and selection of hearing aids and other sensory prosthetic devices. *Prerequisite:* SPSHS 450. 1 unit.

453. Hearing Aids and Amplification

Study of technical and clinical aspects of personal hearing aids and amplification devices; survey of clinical and experimental literature; laboratory experience in electroacoustic and real-ear measurement, earmold impressions and modification procedures, and solving fitting problems. *Prerequisite:* SPSHS 450. 1 unit.

454. Seminar in Advanced Audiological Assessment

Seminar on current research in advanced audiology, with emphasis on experimental and clinical protocols involving electrophysiologic and behavioral measures in areas including newborn auditory screening using evoked potentials, intraoperative and intensive care unit monitoring, brain-mapping, event-related potentials, central auditory assessment, and computerized assessment of balance function. *Prerequisite:* SPSHS 451 or equivalent, or consent of instructor. 1 unit.

455. Communication and Language Problems of the Hearing Impaired

Advanced course in the problems and procedures involved in the acquisition of language and communication by persons with severe hearing impairment, particularly those with profound prelingual deafness; emphasis on research and measurement in the development of speech, speechreading, residual hearing, reading, written language, and manual communication, including finger spelling and the language of signs; and stress on the applications of recent approaches in linguistics and psycholinguistics to language development. *Prerequisite:* Consent of instructor. 1 unit.

456. Seminar in Sensory Prosthetic Devices for Individuals with Hearing Loss

Seminar on current research in signal processing approaches and experimental protocols for

the development and fitting of hearing aids, tactile aids, cochlear implants, and assistive listening devices. *Prerequisite:* SPSHS 453 or consent of instructor. 1 unit.

459. Advanced Clinical Practicum in Audiological Assessment and (Re)Habilitation

Supervised assessment and management of patients. Includes audiological evaluation techniques; treatment counseling; hearing aid selection, evaluation, and dispensing; and aural rehabilitation therapy. External placement in a variety of sites is available as well as in the departmental Audiology Clinic. *Prerequisite:* Graduate standing, plus SPSHS 378, 390, 393, or equivalent course work and consent of instructor. ¼ to 1 unit.

471. Communication Disorders in Multicultural Populations

Seminar focuses on theory, research, and clinical issues related to communication disorders in multicultural populations. Topics include culture, dialect, bilingualism, and other clinical considerations that affect assessment and treatment of children and adults from multicultural populations who have speech, language, or hearing disorders. *Prerequisite:* Consent of instructor. 1 unit.

472. Neural Bases of Speech and Language

Advanced study of neuroanatomy and neurophysiology with emphasis on current research pertaining to nervous system structures and functions important for speech and language. Critical analyses of current theories of the function of neural mechanisms utilized in speech and language. *Prerequisite:* SPSHS 375 and 376, or equivalent, or consent of instructor. 1 unit.

473. Seminar in Counseling and Communication Disorders

Focuses on counseling principles, theories, and methods useful to the speech-language pathologist and audiologist when working with communication disordered individuals and their families. Issues related to ethics, values, grief, culture, family systems, the impact of disability, referral sources, and techniques for interviewing and counseling are discussed. *Prerequisite:* Consent of instructor. 1 unit.

475. Advanced Clinical Practicum in Speech-Language Pathology

Supervised management of clients demonstrating a variety of communicative disorders. Participation in diagnosis of problems and planning of treatment. External placement in a variety of outside sites. *Prerequisite:* Graduate standing, plus SPSHS 201 or equivalent and consent of instructor. ¼ to 1 unit.

477. Clinical Sociolinguistics

Clinical application of sociolinguistic concepts for communicatively impaired populations. Focuses on language difference, and utilizes technological strategies needed for assessment and intervention with linguistically diverse populations. Includes computer analysis of talk data from language disordered and linguistically different speakers. Consent of instructor. 1 unit.

491. Seminar in Hearing Disorders

Principles and methods of clinical management of all types of hearing disorders; survey of current literature and research. The following topics are offered in rotation, one or two each semester: automatic audiometry, aural rehabilitation, and hearing aids and amplification. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 3 units.

495. Special Problems

Investigation of speech and hearing projects not included in theses. *Prerequisite:* Consent of head of the department. ½ to 2 units.

496. Proseminar in Speech and Hearing Science

Required seminar for all graduate students; involves reporting of ongoing research of faculty, visiting researchers, and students. 0 units.

499. Thesis Research

Individual research in the various areas of speech and hearing science. 0 to 4 units.

SPEECH COMMUNICATION

Head of Department: D. L. Swanson
Department Office: 244 Lincoln Hall, 702 South Wright Street, Urbana
Phone: 333-2683
URL: www.spcomm.uiuc.edu

Speech Communication (SPCOM)**101. Principles of Effective Speaking**

Preparation and presentation of short informative and persuasive speeches; emphasis on the selection and organization of material, methods of securing interest and attention, and the elements of delivery. 3 hours. Credit is not given for both SPCOM 101 and either 111 or 112.

102. Introduction to Speech Communication

Survey of the questions probed, the methods employed, and the current status of knowledge in the speech communication discipline; provides opportunities to understand the range of concerns and to explore specific areas of interest of the field. 4 hours.

111. Verbal Communication

Principles and practice in communication; stress on fundamentals of exposition in writing and speaking. The Campus rhetoric requirement is fulfilled by this course in conjunction with SPCOM 112. 3 hours. Credit is not given for both SPCOM 111 and 112, and any other course or sequence of courses that fulfills the Composition I requirement (i.e., RHET 100; 101 and 102; 103 and 104; 108; E S L 114 and 115). Credit is also not given for both SPCOM 111-112 and 101. SPCOM 111-112 may

not be taken by students who have completed the University's Composition I requirement.

112. Verbal Communication

Theory and practice of communication; stress on deliberation and fundamentals of persuasion through speaking and writing. The campus rhetoric requirement is fulfilled by this course in conjunction with SPCOM 111. *Prerequisite:* SPCOM 111. 3 hours. Credit is not given for both SPCOM 111–112 and any other course or sequence of courses that fulfills the Composition I requirement (i.e., RHET 100; 101 and 102; 103 and 104; 105; 108; E S L 114 and 115). Credit is not given for both SPCOM 111–112 and 101. SPCOM 111–112 may not be taken by students who have completed the campus' Composition I requirement.

113. Group Discussion and Conference Leadership

Study of leadership, group process, and interpersonal relations in the small group, conference, and the public forum; emphasis on practice in leading and participation in various types of public discussion and conference, with materials drawn from current public questions. *Prerequisite:* Sophomore standing. By consent of the head of the department the prerequisite may be waived for superior students, including James Scholars. 3 hours.

120. Advanced Oral Communication

Advanced principles of speech preparation and presentation; special problems and types of speeches; and considerable practice in composition and delivery of speeches. *Prerequisite:* SPCOM 101 or equivalent. 3 hours.

141. Oral Interpretation

Same as THEAT 180. Oral reading for understanding, appreciation, and communication. 3 hours.

142. Group Oral Interpretation of Literature

Same as THEAT 181. Study of modern modes of group presentation of literature; emphasis on practice in script preparation, directing, and performance in chamber theatre and readers' theatre. *Prerequisite:* SPCOM 141 or consent of instructor. 2 hours.

161. Fundamentals of Acting

Same as THEAT 170. See THEAT 170.

177. The Arts of Public Discourse

The nature and forms of practical and artistic public speech, including adaptations for the mass audience. 4 hours.

178. Introduction to Theatre Arts

Same as THEAT 178. See THEAT 178.

191. Freshman Honors Tutorial

Study of selected topics on an individually arranged basis. Open only to honors majors or to Cohn Scholars and Associates. *Prerequisite:* Consent of departmental honors adviser. 1 to 3 hours. May be repeated once.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. General Phonetics

Same as SPSHS 201. See SPSHS 201.

204. Speech for Teachers

Course in teaching methods designed for prospective teachers who are nonspeech communication majors; discussion of methods and materials available for teaching speech and directing extracurricular speech activities. 3 hours.

207. Analysis of Screen Genre

General introduction to the theory and analysis of film and television genre; detailed study of one or two representative types of genres (genres vary from semester to semester). Considers aesthetic, ideological, cultural, and historical views of genre. Students are required to view a limited number of films and television programs outside of class. *Prerequisite:* Sophomore standing and SPCOM 102 or 177, or one course in film. 3 hours.

208. Ideology and the Rhetoric of Film

Examines the nature and communicative functions of the ideological content of narrative cinema, with emphasis on the Hollywood film; considers ideological dimensions of film as communication, explicit and implicit ideological dimensions of the Hollywood social problem film, relationship of genre and ideology, and the ideology of the institution of cinema. *Prerequisite:* Sophomore standing and one course in speech communication or film. 3 hours.

210. The Rhetorical Tradition

Survey of major trends in the development of rhetorical theory from Homer to the present. 3 hours. (Counts for advanced hours in L.A.S.)

211. Business and Professional Speaking

Study, preparation, and presentation of the chief types of business speeches; special attention to conferences, sales talks, interviews, and job applications. *Prerequisite:* SPCOM 101. 2 hours.

212. Introduction to Organizational Communication

Considers major theories, research questions, and approaches. *Prerequisite:* SPCOM 102. 3 hours.

213. Persuasion and the Arts

Introduction to the study of narrative films, theatre, fiction, and poetry as vehicles of indirect and overt persuasion. 3 hours.

220. Verbal Communication for Business and the Professions

Advanced topics in oral and written composition, including: the nature of policy-oriented communication; analysis and formulation of positions on issues of professional, personal, or public interest; design and presentation of written and oral messages addressed to varying tasks and audiences. *Prerequisite:* Completion of campus Composition I general education requirement. 3 hours.

221. Persuasion

Study of the processes of motivation as applied to speeches intended to influence group opinion and action; practice in the

preparation and delivery of short persuasive speeches. *Prerequisite:* SPCOM 101; junior standing. 3 hours. (Counts for advanced hours in L.A.S.)

223. Argumentation: Theory and Practice

Study of the theory of argument, e.g., evidence, reasoning, and construction of briefs; practice in formal and informal forms of debate and public discourse on current public questions. *Prerequisite:* SPCOM 101; sophomore standing. By consent of the head of the department, the prerequisite may be waived for superior students, including James Scholars. 3 hours. (Counts for advanced hours in L.A.S.)

230. Interpersonal Communication

Study of communication theory and its application to interpersonal relations; extensive discussion of problems of conflict and misunderstanding in personal affairs to facilitate the development of knowledge, insights, and skills in the processes of face-to-face interaction. *Prerequisite:* SPCOM 101 and sophomore standing; by consent of the head of the department, the prerequisite may be waived for superior students, including James Scholars. 3 hours. (Counts for advanced hours in L.A.S.)

247. Teaching of Speech

Study of methods and materials used in teaching speech in the high school. *Prerequisite:* Senior standing. 3 hours.

251. Communication Problems in Public Information Management

Study of communication problems and practices involved in the management of public information. Considers functions, contexts, and evaluation of public information efforts. *Prerequisite:* Sophomore standing and one course in SPCOM. 3 hours.

252. The Rhetoric of Dissent

Study of the rhetorical strategies and tactics employed in selected cases of dissent in American political and social life. *Prerequisite:* SPCOM 101 or 102, or consent of instructor. 3 hours. (Counts for advanced hours in L.A.S.)

253. Case Studies in Public Discourse

Detailed examination of selected cases of significant public discourse. *Prerequisite:* SPCOM 101 or 102, or consent of instructor. 3 hours.

254. Freedom of Speech and the Ethics of Speech Communication

Examination of the nature and variety of responses to value questions concerning communication; includes a survey of the evolution of and current controversies in freedom of speech. *Prerequisite:* SPCOM 101 or 102, or consent of instructor. 3 hours. (Counts for advanced hours in L.A.S.)

255. Directing: Script Preparation

Same as THEAT 281. See THEAT 281.

290. Individual Study

Individual investigation of special problems. *Prerequisite:* Twelve hours of speech communication; a GPA of 3.25; and consent of head of department. 2 hours. May be repeated to a

maximum of 4 hours. (Counts for advanced hours in L A S.)

291. Honors Individual Study

Individual investigation of special problems. *Prerequisite:* Twelve hours of speech communication; a GPA of 3.50; and consent of head of department. 2 hours. May be repeated to a maximum of 4 hours. (Counts for advanced hours in L A S.)

293. Honors Senior Thesis

Individual study leading to a thesis for honors in the Department of Speech Communication. *Prerequisite:* Senior standing; a GPA of 3.50; and consent of head of department. 2 hours. May be repeated to a maximum of 4 hours. (Counts for advanced hours in L A S.)

296. Special Topics in Speech Communication

Special topics in speech communication not treated in regularly scheduled courses. See *Timetable* for current topics. *Prerequisite:* Sophomore standing and one course in speech communication; or consent of instructor. 3 hours. May be repeated to a maximum of 6 hours. (Counts for advanced hours in L A S.)

308. Cultural Analysis of Screen Media

Same as COMM 308. Study of theories and methods for analyzing the cultural significance and influence of the content of film and television media; detailed application to one or two particular dimensions of the relationship of screen media to culture (applications vary from semester to semester and are chosen to highlight current issues in cultural analysis of media). Students are required to view a limited number of films and television programs outside of class. *Prerequisite:* SPCOM 207 or 208 or 213; or consent of instructor. 3 hours or 1 unit.

311. Organizational Communication Assessment

Organizational communication theory applied to the assessment of communication practices in organizations; systematic procedures for diagnosing communication problems and facilitating effective communication in organizations. Extensive use of case studies. Students conduct a communication audit of an organization. *Prerequisite:* SPCOM 212. 3 hours or 1 unit.

312. Organizational Communication Processes

Advanced study of theory and research in organizational communication; considers such topics as communication networks, superior-subordinate communications, task-related and social information processing, and communicating with the external environment. *Prerequisite:* SPCOM 212. 3 hours or 1 unit.

313. Interpersonal Communication: Discussion and Interview

Advanced study of theory, research, techniques, and training methods in interviewing and group discussion; emphasis on empirical research findings concerning communication processes in face-to-face groups. *Prerequisite:*

Junior standing or consent of instructor. 3 hours, or ½ or 1 unit.

315. Greek, Roman, and Medieval Rhetorical Theory

Same as CLCIV 315. Examination of the development of rhetorical theory, criticism, and pedagogy in Western thought; analysis of the contributions of major figures and works from Homer to the Renaissance. *Prerequisite:* Junior standing or consent of instructor. 3 hours, or ½ or 1 unit.

317. Contemporary Rhetorical Theory

Coverage of the major contributors to rhetorical theory from James and Winans to the present. 3 hours, or ½ or 1 unit.

319. Studies in Russian and East European Cinema

Same as CINE, COMM, and SLAV 319. See SLAV 319.

320. Argumentation and Public Decision Making

Study of the philosophical, logical, and psychological bases of public decision making through discussion and debate. *Prerequisite:* SPCOM 223 or consent of instructor. 3 hours, or ½ or 1 unit.

321. Theories of Persuasion

Survey of theories of persuasion derived from rhetorical, philosophical, and psychological sources and their application to persuasive discourse. *Prerequisite:* SPCOM 221 or graduate standing. 3 hours, or ½ or 1 unit.

322. Renaissance and Modern Rhetorical Theory

Significant movements in the development of rhetorical theory in England, France, and America from 1500 to the present. *Prerequisite:* Senior standing. 3 hours, or ½ or 1 unit.

323. Rhetorical Criticism

Methods of interpreting and judging persuasive discourse with emphasis on political speaking and writing; lectures and practice in criticism. *Prerequisite:* Credit or concurrent registration in SPCOM 322 or 350. 3 hours, or ½ or 1 unit.

324. Persuasion in the Campaign and Movement

Consideration of factors central to the sustained persuasive campaign or movement; special attention to the nature and functions of persuasion in the political campaign. *Prerequisite:* SPCOM 221 or 321, or consent of instructor. 3 hours, or ½ or 1 unit.

325. Politics and the Media

Same as COMM and POLS 322. Examines the interaction between the media and politics in the United States and elsewhere, with special emphasis on the constitutional protection of the media, politics of media control, impact of the media on such political processes as elections and policymaking, international news agencies and communications satellites, and quest for a new international information order. *Prerequisite:* POLS 150, or six hours of social science; or consent of instructor. 3 hours, or ½ to 1 unit.

329. Language of Religion

Same as RELST and LING 329. See RELST 329.

332. Women and Language

Same as LING and WS 332. Study of actual and perceived differences and similarities in the use of language by women and by men; emphasizes the social contexts of speech. *Prerequisite:* A course in speech communication or linguistics, or equivalent. 3 hours or 1 unit.

335. Interpersonal Communication Processes

Same as COMM 335. Study of the major processes involved in an individual's adjustment to the communication situations of everyday life; emphasis on the development of interpersonal competency and orientations, social perception, interpersonal sentiment and hostility, trust, and the social context as factors influencing the understanding and evaluation of interpersonal messages. 3 hours, or ½ or 1 unit.

342. Oral Interpretation of Poetry

Analysis and oral presentation of literature representative of various poetic forms. *Prerequisite:* SPCOM 141. 3 hours, or ½ or 1 unit.

344. Criticism of the Oral Interpretation of Literature

Examination of theories of aesthetics and practical criticism and their application to the criticism of specific examples of the oral performance of literature. *Prerequisite:* SPCOM 141 or graduate standing, or consent of instructor. 3 hours, or ½ or 1 unit.

345. Oral Interpretation of Prose Fiction

Same as THEAT 376. Modern concepts underlying the relationship of interpretation to the reader's experience of literature; discussions, reports, and oral interpretations of prose forms (including chamber theatre and readers' theatre). *Prerequisite:* SPCOM 141 or consent of instructor. 3 hours, or ½ or 1 unit.

350. Selected Topics in the History and Criticism of Public Discourse

Study of selected periods and genres of public discourse in historical context, including British, American, French, Russian, German, Chinese, and Japanese. *Prerequisite:* One course in rhetorical criticism or consent of instructor. 3 hours, or ½ or 1 unit. May be repeated as topics vary to a maximum of 12 hours or 4 units.

353. Criticism of Contemporary Public Discourse

Rhetorical criticism of selected aspects of contemporary public communication. 3 hours, or ½ or 1 unit.

374. Introduction to Empirical Research Methods in Speech Communication

Introduction to descriptive and experimental methods in speech communication; intended to produce understanding and critical evaluation of research designs. 3 hours or ½ unit.

375. Speech Science, I

Same as LING and SPSHS 375. See SPSHS 375.

376. Speech Science, II
Same as LING and SPSHS 376. See SPSHS 376.

383. Development of Spoken Language
Same as SPSHS 383. See SPSHS 383.

396. Combined Undergraduate/Graduate Seminar
Seminar on advanced topics in speech communication not treated in regularly scheduled courses; see *Timetable* for current topics. *Prerequisite:* Junior standing and two courses in speech communication, or consent of instructor. 3 hours, or ½ or 1 unit. May be repeated to a maximum of 6 hours or 2 units.

405. Writing Studies I: Social Contexts and Functions of Writing
Same as ENGL 405, and C & I 463. Reviews theory and research on the social and historical development of writing systems, including consideration of the relationship between oral and written language, writing and other graphic representation systems, alternative technologies, the evolution of writing systems, and the social functions of literacy. *Prerequisite:* Admission to the graduate programs of a unit offering the graduate specialization in Writing Studies, or consent of instructor. 1 unit.

406. Writing Studies II: Writing Processes and Their Development
Same as ENGL 406 and C & I 464. Reviews theory and research on the acquisition of writing, including consideration of cognitive processes employed during writing, the acquisition of writing competence, assessment of writing skill, and methods of instruction in basic and advanced written communication skills. *Prerequisite:* SPCOM 405, or consent of instructor. 1 unit.

429. Seminar in Speech Communication
Special topics in speech communication. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 4 units.

430. Contemporary Theories of Oral Communication
Systematic study of speech making and discussion as related to contemporary views of communication; examination of the theoretical literature and experimental evidence. *Prerequisite:* Consent of instructor. 1 unit.

436. Seminar in Theories and Procedures of Discussion
Intensive examination of selected problems of communication in small, task-oriented groups; evaluation of special instrumental forms, such as the unstructured group, the work group, the panel, and the lecture-forum; critical analysis of recent research in group communication as a means of making decisions and of changing attitudes and behavior. *Prerequisite:* SPCOM 313 or equivalent. 1 unit.

437. The Analysis of Interpersonal Interaction
Same as COMM 437. Exploration of theory, methodology, and empirical findings of descriptive and experimental approaches to the analysis of verbal and nonverbal interaction processes, in both laboratory and naturalistic settings. *Prerequisite:* SPCOM 335 or consent of instructor. 1 unit.

438. Seminar in Rhetorical Theory
Study of special topics in the history of rhetorical theory. 1 unit. May be repeated for a maximum of 4 units.

468. Seminar in Theatre History
Same as THEAT 406. See THEAT 406.

474. Experimental Design in Speech Communication Research
Detailed treatment of major issues and options in designs employed in speech communication research. *Prerequisite:* SPCOM 374 or equivalent; introductory statistics course. ½ or 1 unit.

495. Special Problems
Individual investigation of special projects not included in theses. *Prerequisite:* Consent of head of department. ½ to 2 units. Open to master's candidates for a maximum of 1 unit, and to doctoral candidates for 1 or 2 units.

499. Thesis Research
0 to 4 units.



STATISTICS

Head of Department: Adam T. Martinsek
Department Office: 101 Illini Hall, 725 South Wright Street, Champaign
Phone: 333-2167
URL: www.stat.uiuc.edu

Statistics (STAT)

100. Statistics
Same as MATH 161. First course in probability and statistics at a precalculus level; emphasizes basic concepts, including descriptive statistics, elementary probability, estimation, and hypothesis testing in both nonparametric and normal models. *Prerequisite:* MATH 112. 3 hours. Credit is not given for both STAT 100 and any one of the following: ECON 171 or 172, PSYCH 233, 234, or 235, or SOC 385.

290. Individual Study
Prerequisite: Consent of instructor. 1 or 2 hours. May be repeated to a maximum of 8 hours.

291. Honors Individual Study
Prerequisite: Consent of instructor. 1 or 2 hours. May be repeated to a maximum of 8 hours.

308. Actuarial Statistics, I
Same as MATH 308. Examines elementary theory of probability, including independence, conditional probability, and Bayes' theorem; combinations and permutations; random variables, expectations, and probability distributions; joint and conditional distributions; functions of random variables; sampling; central limit theorem. *Prerequisite:* MATH 242 or 245, or equivalent. 4 hours or 1 unit. Credit is not given for both STAT 308 and either MATH 361 or STAT 310.

309. Actuarial Statistics, II
Same as MATH 309. Continuation of STAT 308. Examines parametric point and interval estimation, including maximum likelihood estimation, sufficiency, completeness, and Bayesian estimation; hypothesis testing; linear models; regression and correlation. *Prerequisite:* STAT 308. 4 hours or 1 unit. Credit is not given for both STAT 309 and 311.

310. Introduction to Mathematical Statistics and Probability, I
Same as MATH 363. Introduction to mathematical statistics that develops probability as needed; includes the calculus of probability, random variables, expectation, distribution functions, central limit theorem, point estimation, confidence intervals, and hypothesis testing. Offers a basic one-semester introduction to statistics and also prepares students for STAT 311. *Prerequisite:* MATH 242 or 245, or equivalent. 4 hours or 1 unit.

311. Introduction to Mathematical Statistics and Probability, II
Same as MATH 364. Continuation of STAT 310. Includes moment-generating functions, transformations of random variables, normal sampling theory, sufficiency, best estimators, maximum likelihood estimators, confidence intervals, most powerful tests, unbiased tests, and chi-square tests. *Prerequisite:* STAT 310; or STAT 100 and MATH 361. 3 hours or 1 unit. Credit is not given for both STAT 311 and 309.

320. Methods of Applied Statistics
Same as MATH 369. Systematic, calculus-based coverage of the more widely used methods of applied statistics, including simple and multiple regression, correlation, analysis of variance and covariance, multiple comparisons, goodness of fit tests, contingency tables, nonparametric procedures, and power of tests; emphasizes when and why various tests are appropriate and how they are used. *Prerequisite:* STAT 308 or 310, MATH 130 or 134 or equivalent, and knowledge of basic matrix manipulations; or consent of instructor. 3 hours or 1 unit.

324. Analysis of Variance
Same as MATH 365. Estimation and hypotheses testing in linear models; one-, two-, and higher-way layouts; incomplete layouts; analysis of covariance; and random effects models and mixed models. *Prerequisite:* Credit or concurrent registration in MATH 315 and STAT 311. 3 hours or 1 unit.

325. Applied Regression and Design
Explores linear regression, least squares estimates, F-tests, analysis of residuals, regression diagnostics, transformations, model building, factorial designs, randomized complete block designs, Latin squares, and split plot designs. Computer work is an integral part of the course. *Prerequisite:* STAT 311. 3 hours or 1 unit.

326. Sampling and Categorical Data
Sampling: simple random, stratified, systematic, cluster, and multistage sampling. Categorical data: multiway contingency tables, maximum likelihood estimation, goodness-of-fit tests, model selection, logistic regression.

Computer work is an integral part of the course. *Prerequisite:* STAT 311. 3 hours or 1 unit.

327. Statistical Consulting

Students, working in groups under the supervision of the instructor, consult with faculty and graduate students through the Statistical Consulting Service; readings from literature on consulting. *Prerequisite:* STAT 325 or consent of instructor. 3 hours or 1 unit.

328. Statistical Computing

Same as MATH 393. Examines statistical packages, numerical analysis for linear and non-linear models, graphics, and random number generation and Monte Carlo methods. *Prerequisite:* STAT 311 or equivalent; knowledge of a programming language. 3 hours or 1 unit.

329. Time Series Analysis

Same as MATH 394. Studies theory and data analysis for stationary and pre-stationed time series; examines auto-regressive moving average model building and statistical techniques; and discusses spectral model building and statistical analysis using windowed periodograms and Fast Fourier Transformations. *Prerequisite:* STAT 311. 3 hours or 1 unit.

330. Topics in Applied Statistics

Same as MATH 368. Formulation and analysis of mathematical models for random phenomena; extensive involvement with the analysis of real data; and instruction in statistical and computing techniques as needed. *Prerequisite:* STAT 311 or 320; or consent of instructor. 3 hours or 1 unit. May be taken for credit more than once with consent of instructor.

351. Introduction to Probability Theory, I

Same as MATH 361. See MATH 361.

356. Introduction to Probability Theory, II

Same as MATH 366. See MATH 366.

358. Mathematical Modeling in Life Sciences

Same as ANSCI and BIOL 358. See ANSCI 358.

410. Mathematical Statistics, I

Distributions, transformations, order-statistics, exponential families, sufficiency, delta-method, Edgeworth expansions; uniformly minimum variance unbiased estimators, Rao-Blackwell theorem, Cramer-Rao lower bound, information inequality; equivariance. *Prerequisite:* STAT 311. 1 unit.

411. Mathematical Statistics, II

Bayes estimates, minimaxity, admissibility; maximum likelihood estimation, consistency, asymptotic efficiency; testing and confidence intervals; Neyman-Pearson lemma, uniformly most powerful tests; likelihood ratio tests and large-sample approximation; nonparametrics. *Prerequisite:* STAT 410. 1 unit.

425. Current Research in Applied and Computational Statistics

Various topics, such as ridge regression; robust regression; jackknife, bootstrap, cross-validation and resampling plans; E-M algorithm; projection pursuit; all with a strong computational flavor. *Prerequisite:* STAT 325,

326, and 411; or consent of instructor. 3 hours or 1 unit.

451. Theory of Probability, I

Same as MATH 451. See MATH 451.

452. Theory of Probability, II

Same as MATH 452. See MATH 452.

453. Probability and Measure, I

Same as MATH 481. Measures and probabilities; integration and expectation; convergence theorems and inequalities for integrals and expectations; independence; convergence in probability, almost surely, and mean; Three Series Theorem; laws of large numbers. *Prerequisite:* MATH 347 or consent of instructor. 1 unit. Credit is not given for both STAT 453 and either MATH 441 or 451.

454. Probability and Measure, II

Same as MATH 482. Measure extensions, Lebesgue-Stieltjes measure, Kolmogorov consistency theorem; conditional expectation, conditional probability, martingales; distribution functions and characteristic functions; convergence in distribution; Central Limit Theorem; Brownian Motion. *Prerequisite:* MATH 481. 1 unit. Credit is not given for both STAT 454 and either MATH 451 or 452.

455. Applied Stochastic Processes

Same as MATH 461. See MATH 461.

463. Information Theory

Same as C S 478 and ECE 463. See ECE 463.

471. Multivariate Analysis

Same as MATH 471. Inference in multivariate statistical populations emphasizing the multivariate normal distribution; derivation of tests, estimates, and sampling distributions; and examples from the natural and social sciences. *Prerequisite:* STAT 311 and MATH 315, or consent of instructor. 1 unit.

475. Large Sample Theory

Limiting distribution of maximum likelihood estimators, likelihood ratio test statistics, U-statistics, M-, L-, and R-estimators, nonparametric test statistics, Von Mises differentiable statistical functions; asymptotic relative efficiencies; asymptotic expansions. *Prerequisite:* STAT 411 and either MATH 451 or STAT 454. 1 unit.

478. Topics in Statistics

Same as MATH 478. *Prerequisite:* Consent of instructor. 1 unit.

488. Covariance Structure and Factor Models

Same as EDPSY, PSYCH and SOC 488. See PSYCH 488.

490. Reading Course

Directed reading on various topics. *Prerequisite:* Consent of instructor. 1 or 2 units. May be repeated, subject to approval by the student's adviser.

499. Thesis Research

Prerequisite: Consent of instructor. 0 to 4 units.

TECHNICAL SYSTEMS MANAGEMENT

(See Agricultural Engineering)

THEATRE

Head of Department: Robert Graves
Department Office: 4-122 Krannert Center for the Performing Arts, 500 South Goodwin Avenue, Urbana
Phone: 333-3538
URL: www.theatre.uiuc.edu/theatre

Theatre (THEAT)

100. Practicum, I

Practical work in acting and theatre management, and in the design, construction, and handling of scenery, lighting, sound, properties, costumes, and makeup for public performance. Forty hours of production activity to be arranged for each credit hour. *Prerequisite:* Consent of instructor for nontheatre majors. 1 to 3 hours. May be repeated to a maximum of 12 hours.

109. Dramatic Analysis

Introduction to the study of plays for theatre practitioners employing analytical methods and plays from modern theatre. Requires paper or project assignments for each play. *Prerequisite:* Consent of instructor for nontheatre majors. 3 hours.

110. Literature of the Modern Theatre

Introduction to the principal modes of dramatic expression from around 1870 to the present day. *Prerequisite:* Completion of campus Composition I general education requirement; and THEAT 109 or consent of instructor. 3 hours.

120. Basic Theatre Practice: Scenecraft

Introduction to stage scenecraft techniques: basic carpentry, rigging, scene painting, and technical drafting. Practical experience on realized productions required. *Prerequisite:* For nontheatre majors, consent of instructor. 2 hours.

121. Basic Theatre Practice: Costume Technology

Introduction to stage costume design and technology: approach to design, basic costume skills, and craft techniques. Practical experience on realized productions required. *Prerequisite:* For nontheatre majors, consent of instructor. 2 hours.

122. Basic Theatre Practice: Lighting Technology

Introduction to stage lighting design and practice: approach to lighting design, basic lighting technology, light plots, and instrument schedules. Practical experience on realized productions required. *Prerequisite:* For non-theatre majors, consent of instructor. 2 hours.

123. Basic Theatre Practice: Makeup

Introduction to stage makeup techniques: basic makeup painting, practice in corrective, aging, and character makeup and introduction to creating facial hair and wigs. Practical experience on realized productions required. *Prerequisite:* For nontheatre majors, consent of instructor. 2 hours.

125. Graphic Skills

Introduction to drawing, drafting, and model building for the theatre. Drawing and drafting supplies are required. *Prerequisite:* For nontheatre majors, consent of instructor. 3 hours.

170. Fundamentals of Acting

Same as SPCOM I61. Study of the methods of acting, with emphasis on basic acting techniques; role of character in relation to play as a whole, the internal and emotional values of the play, and their interpretation by means of voice and action. 3 hours.

175. Improvisation in Acting

Exploration and communication of experience through speech and action on the stage. *Prerequisite:* THEAT 170. 3 hours.

176. Relationships in Acting

Behavior in stage performance explored on the basis of the actor's relationship with self, with objects, and with other players; emphasizes analysis of playscript to discover action, environment, and relationships. *Prerequisite:* THEAT 175; or consent of instructor. 3 hours.

177. Acting: The Author, The Play and The Role

Beginning scene work with special emphasis on analysis of plays, roles, characterization, and application of skills learned through improvisation and relationships in acting. *Prerequisite:* THEAT 176. 3 hours.

178. Introduction to Theatre Arts

Same as SPCOM 178. Introduction to models of theatre production, including approaches to playwriting, acting, design, directing, theatre history, minority theatre, plays by women, and the integration of these elements in theatrical production. Lectures, discussions, and attendance at three Department of Theatre productions is required. 3 hours.

179. Acting: Voice

Fundamentals of voice and speech production. Deals with the fundamental elements involved in vocal production and good clear speech. Through exercises, the vocal and speech mechanisms are developed and applied to the delivery of text. *Prerequisite:* For nontheatre majors, consent of instructor. 2 hours.

180. Oral Interpretation

Same as SPCOM 141. See SPCOM 141.

181. Group Oral Interpretation of Literature

Same as SPCOM 142. See SPCOM 142.

182. Acting: Movement

Basic physical training for expressive body awareness and dynamics. *Prerequisite:* THEAT 175, or consent of instructor. 2 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

210. Stage Electronics

Laboratory course to familiarize the beginning theatre student with current wiring practices and control techniques related to theatrical electronic control systems. 3 hours.

223. Stage Mechanics, I

Studies traditional materials, techniques, and processes used in executing scenery for the theatre. *Prerequisite:* THEAT 120 or consent of instructor. 4 hours.

224. Stage Mechanics, II

Examines newly accepted and developing techniques, processes, and materials used in constructing and rigging stage scenery. *Prerequisite:* THEAT 223. 4 hours.

225. Scene Design, I

Projects and lectures addressing basic technical and aesthetic skills of scene design. 3 hours.

227. Senior Projects in Design, I

Professional studio and independent projects for student designers specializing in stage scenery, lighting, or costume design. *Prerequisite:* Consent of instructor. 6 hours.

228. Senior Projects in Design, II

Continuation of THEAT 227. *Prerequisite:* THEAT 227. 6 hours.

230. Technical Direction

Studies in theatre production organization and technical direction. 3 hours.

231. Introduction to Stage Lighting

Studio course analyzing current lighting practices and equipment by means of production oriented assignments. 3 hours.

232. Advanced Lighting Design

Lighting design for the proscenium, arena, and thrust stage. *Prerequisite:* THEAT 231, or consent of instructor. 3 hours.

233. Stage Drafting

Drafting for scenery construction and rigging. *Prerequisite:* THEAT 125. 4 hours.

242. Introduction to Costuming

Introduction and practice of basic sewing, craft, fabrication, dyeing and patterning skills required to construct and accessorize period theatrical costumes. 3 hours.

253. Acting Studio, I

Acting in twentieth century plays. Concentrated training in American dialects and development of movement skills and mask characterization. A performance is given at the end

of the semester. 1 to 8 hours. Students must register for all sections to receive credit.

254. Acting Studio, II

Development of the actors' skills for musical theatre through the study of dance for actors, movement for the stage, body alignment and awareness, continued vocal training emphasizing singing, and analysis and performance of British and American musical materials. A performance is given at the end of the semester. *Prerequisite:* THEAT 253. 1 to 8 hours. Students must register for all sections to receive credit.

255. Acting Studio, III

Major emphasis on acting in Shakespearean and other Elizabethan drama; training in stage combat, sword and rapier; concentration on speech for Shakespeare and the classical stage. A performance is given at the end of the semester. *Prerequisite:* THEAT 254. 1 to 8 hours. Students must register for all sections to receive credit.

256. Acting Studio, IV

Study of the techniques of acting for the camera; scenes are recorded on audio-visual tape; special topics include speech for the microphone and unarmed combat for the stage. A performance is given at the end of the semester. *Prerequisite:* THEAT 255. 1 to 8 hours. Students must register for all sections to receive credit.

263. Theatre of the Black Experience

Surveys the Black Theatre Movement's history and literature, and studies dramatic works focused on the black experience through the rehearsal and performance of representative works of black dramatists. 3 hours. May be repeated to a maximum of 9 hours.

281. Directing: Script Preparation

Same as SPCOM 255. Methods of script analysis and the development of production concepts; explorative projects culminate in the reading of a script for rehearsal. *Prerequisite:* THEAT 170, or consent of instructor. 3 hours.

291. Individual Topics

Individual projects and problems. *Prerequisite:* Consent of instructor. 2 hours.

292. Individual Topics

Individual projects and problems. *Prerequisite:* Consent of instructor. 2 hours.

300. Practicum, II

Advanced practical work in acting; theatre management; the design, construction, and handling of scenery, lighting, sound, properties, costumes, and makeup for public performance. *Prerequisite:* For nontheatre majors, consent of instructor. 1 to 3 hours, or ¼ or ½ unit. May be repeated to a total of 12 hours or 2 units.

312. Theatre Dance, I

Same as DANCE 312. See DANCE 312.

313. Theatre Dance, II

Same as DANCE 313. See DANCE 313.

314. Premodern Chinese Drama
Same as EALC 313. See EALC 313.

323. Stage Mechanics, III
Study in advanced scenery methods and materials, including advanced woodworking, plastic-craft, and rigging. *Prerequisite:* THEAT 223 and 224, or consent of instructor. 4 hours or 1 unit.

324. Stage Mechanics, IV
Advanced study in the design and construction of moving scenic elements. *Prerequisite:* THEAT 323 or consent of instructor. 2 hours or ½ unit.

325. Advanced Scene Design, I
Advanced problems in scene design for nonproscenium theaters (Section A) and television, film, and industrial design (Section B). *Prerequisite:* THEAT 225, or consent of instructor. 4 hours. May be repeated to a maximum of 8 hours; cannot repeat a section already taken.

326. Advanced Scene Design, II
Advanced problems in scene design for period and style plays (Section A) and development of professional portfolio (Section B). *Prerequisite:* THEAT 325, or consent of instructor. 4 hours. May be repeated to a maximum of 8 hours; cannot repeat a section already taken.

330. Theatre Sound Technology
Exploration of audio production techniques and equipment, as related to theatre sound. Related topics include acoustics, electronics, and music. *Prerequisite:* Junior standing or MFA design major, or consent of instructor. 3 hours, or ¾ unit.

331. Sound Design
Introduction to sound reproduction, recording, and basic systems design as applied to the modern theatre. *Prerequisite:* THEAT 330. 3 hours or ¾ unit.

332. Stage Management
Studies the principles and the craft of production stage management. *Prerequisite:* Sophomore standing in a theatre curriculum or consent of instructor. 4 hours or 1 unit.

334. Video Lighting and Production
Study and practical application of basic television techniques with primary emphasis on lighting. Trips will be made to local television stations as well as major studios in Chicago to meet with lighting directors. *Prerequisite:* THEAT 231 and 232, or equivalent. 3 hours or ¾ unit. Cost of field trips will be paid by student.

335. Lighting for the Musical Stage
Emphasis on lighting design for musicals, opera, and music concerts. Field trips will be made to area productions. *Prerequisite:* THEAT 231 and 232, or equivalent. 3 hours or 1 unit. Cost of field trips will be paid by student.

336. History of Décor
Comparative survey of forms, motifs and design from the Egyptian to the Contemporary. Emphasis is on the relation between design for the stage and the cross disciplinary influences in period form. The process of research for stage design is included. *Prerequisite:*

THEAT 225 or consent of instructor. 3 hours or 1 unit.

337. Scene Painting Techniques
Techniques and practice of scene painting; lab time required. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

338. Rendering Techniques for the Stage
Perspective techniques for the stage; model building; developing the perspective sketch. *Prerequisite:* Consent of instructor. 2 hours or ½ unit.

339. Property Management and Design
Principles of stage property design, planning and management. *Prerequisite:* THEAT 120 or consent of instructor. 2 hours or ½ unit.

340. Lighting Design for Dance
Survey of conceptual technique and practice of dance lighting; also nontraditional lighting problems including disco, rock, cabaret, and industrial shows. *Prerequisite:* THEAT 231 or 232, or equivalent. 4 hours or 1 unit.

341. History of Dance, II
Survey of tracing the development of dance from the rise of Romanticism through the twentieth century. *Prerequisite:* Consent of instructor. 3 hours or 1 unit.

342. Costume Patterning
Methods of draping and drafting patterns for period theatrical costumes. 3 hours or 1 unit.

343. Costume Draping
Development of patterns for theatrical costumes through advanced draping techniques. Extensive lab work culminating in draping and constructing six complete period costumes. Attendance at 10 professional fitting sessions at the Krannert Center for the Performing Arts Costume Shop is required. *Prerequisite:* THEAT 342. 4 hours and 1 unit.

345. Costume History for the Stage, I
Surveys theatrical costume and fashion of major periods; emphasizes relationships to styles of art and dramaturgy, social milieu, and production design. *Prerequisite:* Consent of instructor. 4 hours or 1 unit.

346. Costume History for the Stage, II
Continuation of THEAT 345. *Prerequisite:* THEAT 345 or equivalent. 4 hours or 1 unit.

347. Costume Rendering
Studio course in costume rendering techniques: analysis of costume figure, rendering of fabrics, exploration of various rendering media. *Prerequisite:* Consent of instructor. 3 hours or 1 unit.

348. Costume Fabrication
Explores, through design projects, the appropriateness of various fabrics for specific costumes determined by historical accuracy, style, and constructability. *Prerequisite:* THEAT 345, 346, or consent of instructor. 4 hours or 1 unit.

350. Multi-Ethnic Theatre
Focuses on the history and aesthetics of African, Asian, African Americans, Asian Americans, Latinos, and Native Americans

through the study of plays/productions. *Prerequisite:* THEAT 178. 4 hours or 1 unit.

351. History of Theatre in Western Society, I
Examines the role of theatre in Western culture as a reflection of economic, political, and social forces from its prehistoric origins through the Renaissance. *Prerequisite:* One year of college dramatic literature and junior standing, or consent of instructor. 3 hours or 1 unit.

352. History of Theatre in Western Society, II
Examines the role of theatre in Western culture as a reflection of economic, political, and social forces from the late Renaissance to the present. *Prerequisite:* One year of college dramatic literature and junior standing, or consent of the instructor. 3 hours or 1 unit.

353. Creative Dramatics for Children
Study of the subject matter and techniques of creative dramatics for children with laboratory application. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

354. Theatre for the Child Audience
Study of the history, objectives, and techniques of play production for the child audience; laboratory application. *Prerequisite:* Consent of instructor. 3 hours, or ½ or 1 unit.

355. History of the American Musical Theatre, I
History of the American musical from its earliest forms including ballad opera, extravaganza, minstrelsy, and operetta, to the development of the modern musical of the early 20th century. *Prerequisite:* Junior standing, or consent of instructor. 4 hours or 1 unit.

356. History of the American Musical Theatre, II
History of the American musical in the 20th century, studied through the contribution of the major composers, lyricists, and director/choreographers. *Prerequisite:* THEAT 355, or consent of instructor. 4 hours or 1 unit.

358. Social Issues Theatre
Same as W S 358. Research, writing, and production of original plays that address selected health and social issues on the UIUC campus in cooperation with the Counseling and Health Center. Course will emphasize training in acting and in the methods of peer education and discussion facilitation. 3 hours or 1 unit. May be repeated to a maximum of 6 hours or 2 units. Graduate students will be required to develop additional projects to be approved and assessed by instructor.

361. Development of Theatrical Forms, I
History of the drama and theatre of ancient Greece and Rome, the Middle Ages, and the Italian and English Renaissance. *Prerequisite:* One year of college dramatic literature and junior standing, or consent of instructor. 4 hours or 1 unit.

362. Development of Theatrical Forms, II
History of the drama and theatre of the Spanish Renaissance, seventeenth-century France, the English Restoration, the eighteenth and nineteenth centuries in Europe and America, and Asia. *Prerequisite:* THEAT 361 or

equivalent and consent of instructor. 4 hours or 1 unit.

363. Ibsen in Translation

Same as C LIT and SCAN 363. See SCAN 363.

364. Strindberg in Translation

Same as C LIT and SCAN 364. See SCAN 364.

365. History of American Theatre

Surveys the development of American theatre as a cultural, social, political, and economic institution from the colonial era to the present. *Prerequisite:* Junior standing or consent of instructor. 3 hours or 1 unit.

371. Contemporary Theatrical Forms

Study of post-World War I theatre, including the New Stagecraft, expressionism, Brecht and epic theatre, theatre of the absurd, and later developments. *Prerequisite:* One year of college dramatic literature and junior standing, or consent of instructor. 3 hours or 1 unit.

372. Introduction to Theatre Management

Introduction to the basic practices of theatre and arts management with emphasis on facilities management, arts marketing, and the financial problems in the performing arts. *Prerequisite:* Junior standing in theatre or consent of instructor. 3 hours or 1 unit.

376. Oral Interpretation of Prose Fiction

Same as SPCOM 345. See SPCOM 345.

382. Rehearsal: Directing and Acting Techniques

Laboratory to explore director-actor interaction in productive rehearsals. Three scenes of differing styles and genres developed each semester. *Prerequisite:* THEAT 176, 281, or consent of instructor. 3 hours or 1 unit. Course may be repeated up to 9 hours or 3 units.

385. Preparation for Auditions

Each actor, through extensive research, prepares a portfolio of audition pieces for the opportunities imminent before and after graduation for resident companies, commercial productions, and film, or professional graduate schools. *Prerequisite:* THEAT 253, and 254; or consent of instructor. 2 hours or ½ unit.

390. Professional Internship

Professional employment with an approved host institution in an area related to the student's academic program; exposure to professional situations in which the commercial theatre operates. Full documentation of internship activities required. *Prerequisite:* Junior, senior or graduate standing in theatre; consent of Internship Coordinator. 0 to 14 hours, or 0 to 3 units. May be repeated in the same or subsequent semesters as topics vary.

404. Studies in Theatre History: Twentieth Century

Examines selected movements and contributors to the theatre from the late nineteenth-century to the contemporary period. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 2 units with consent of instructor.

406. Seminar in Theatre History

Same as SPCOM 468. Studies in the history of the theatre. *Prerequisite:* Consent of instructor. 1 unit. May be repeated to a maximum of 4 units.

411. Colloquium in Advanced Design and Theatre Technology

Projects in design for the theatre or in theatre technology, including stage scenery, costuming, lighting, makeup, projections, and sound and stage systems. *Prerequisite:* Candidacy for MFA in theatre with design and technology specialty, or consent of instructor. 1 or 2 units. May be repeated to a maximum of 8 units.

415. Proseminar in Theatre Practice

Review of contemporary theatre practice in the United States and Western Europe, survey of methods in production research, and advanced instruction in theatre specialties. *Prerequisite:* Admission to graduate study in theatre. ¾ or 1 unit.

471. Colloquium in Acting

Intensive professional training in acting, dynamics, voice and speech, and theatre movement with a different focus each semester on one particular period of dramatic literature. *Prerequisite:* Candidacy for MFA in theatre with acting specialty, or consent of instructor. ¼ to 2 units. Students must register for all sections to receive credit. May be repeated to a maximum of 12 units.

491. Special Problems

Individual research in selected topics by arrangement with the instructor. ¼ to 2 units.

495. Creative Project

Open to MFA candidates in theatre only. 1 to 2 units.

499. Thesis Research

0 to 4 units.

THEORETICAL AND APPLIED MECHANICS

Head of Department: Hassan Aref

Department Office: 213 Talbot Laboratory, 104 South Wright Street, Urbana

Phone: 333-2322

URL: www.tam.uiuc.edu

Note: Credit is allowed for only one of T A M 150, 152, or 154. Credit is not allowed for both T A M 212 and T A M 154.

Theoretical and Applied Mechanics (T A M)

150. Introduction to Statics

Forces, moments, couples; resultants of force systems; equilibrium analysis and free-body diagrams; analysis of forces acting on members of trusses, frames, etc.; shear-force and bending-moment distributions; Coulomb friction; centroids and center of mass; applications

of statics in design. *Prerequisite:* PHYCS 111; credit or concurrent registration in MATH 242 or 245. 2 hours. Students may not receive credit for both T A M 150 and 152.

152. Engineering Mechanics I—Statics

Forces, moments, couples; resultants of force systems; equilibrium analysis and free-body diagrams; analysis of forces acting on members of trusses, frames, etc.; shear-force and bending-moment distributions; Coulomb friction; centroids, center of mass, moment of inertia, polar moment of inertia, product of inertia; virtual work; hydrostatic pressure; applications of statics in design. *Prerequisite:* PHYCS 111; credit or concurrent registration in MATH 242 or 245. 3 hours. Students may not receive credit for both T A M 150 and 152.

195. Mechanics in the Modern World

Freshman introduction to engineering mechanics and its role in modern engineering analysis and design. Lecture-project format. 1 hour.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Introduction to Mechanics for Technology and Management

Introduction to engineering mechanics (statics, dynamics, solid mechanics, and fluid mechanics) and the role that mechanics plays in engineering analysis and design. Lecture-discussion format with laboratory sessions. *Prerequisite:* Junior standing in the College of Commerce and Business Administration. 3 hours.

206. Mechanics of Materials and Fluids

Same as MATSE 206. Topics from statics, mechanics of materials, and fluid mechanics pertinent to the fields of metallurgical engineering, ceramic engineering, and materials science and engineering: force resultants, stresses and strains produced in elastic bodies, microscopic effects of different loading states (tension, compression, torsion and bending) on deformable bodies, beam stresses and deflections, introduction to three-dimensional stresses and strains, stress and strain-rate relationships for Newtonian and non-Newtonian fluids, conservation equations (control volume analysis) for fluid flow, Reynolds number, and slow inertial and turbulent flows. Course is tailored for students with interests in materials science and engineering. *Prerequisite:* Credit or concurrent registration in MATSE 201, or consent of instructor. 4 hours. Students may not receive credit for both T A M 206 and either T A M 221 or 235.

212. Engineering Mechanics II—Dynamics

Kinematics and dynamics of the three-dimensional motion of particles; kinematics and dynamics of the plane motion of rigid bodies; methods of work—energy and impulse—momentum; moving reference frames. *Prerequisite:* T A M 150 or 152; MATH 242 or 245. 3 hours.

221. Introduction to Solid Mechanics

Relationship between internal stresses and deformations produced by external forces acting on deformable bodies, and design principles based on mechanics of solids: normal stresses, shear stresses, and deformations produced by tensile, compressive, torsional and bending loading of members; beam deflections; elastic energy and impact; multidimensional stress states; and buckling of columns. *Prerequisite:* T A M 150, 152, or 154; MATH 242 or 245. 3 hours.

222. Solid Mechanics Design

Design problems and projects intended to accompany T A M 221. Primarily for Engineering Mechanics majors. Other students meeting the prerequisites may enroll with consent of instructor. *Prerequisite:* Credit or concurrent registration in T A M 221; sophomore standing in Engineering Mechanics or consent of instructor. 1 hour.

224. Mechanical Behavior of Materials

Same as CEE 210. Mechanical behavior of engineering materials, including metals, ceramics, polymers, concrete, wood, bitumens, and asphaltic concretes; explanations of macroscopic behavior in terms of phenomena at the microscopic level. Lecture-lab format. *Prerequisite:* Completion of Composition I general education requirement; T A M 221. 4 hours.

235. Introduction to Fluid Mechanics

Fluid statics; continuity, momentum and energy principles via control volumes; ideal and real fluid flow; introduction to the Navier-Stokes equation; similitude; laminar and turbulent boundary layers; closed-conduit flow, open-channel flow, and turbomachinery. Lecture-lab format. *Prerequisite:* T A M 212. 4 hours.

292. Design and Analysis in Engineering Practice

Examples of mechanical design problems that occur in engineering practice and the procedures and issues involved in solving them; technical aspects and societal ramifications of the design process; intellectual property, ethics; probability and statistics; case studies; student discussion of design-related issues at different levels; design project reports and presentations; student teams. *Prerequisite:* Junior standing in engineering; or consent of instructor. 3 hours.

299. Senior Thesis

Thesis investigation of special subjects in mechanics, including theoretical and/or experimental research. *Prerequisite:* Senior standing; approval of the head of the department. 3 hours.

308. Fluid Mechanics of Convective Heat Transfer

Same as M E 308. See M E 308.

312. Intermediate Dynamics and Vibrations

Lagrangian mechanics of dynamical systems with an emphasis on vibrations; constraints and generalized coordinates; motion in accelerating frames, conservation laws and invariance of the Lagrangian; particle motion in one dimension, the two-body problem, central-force motion; free and forced vibration

of linearized single-degree-of-freedom and multidegree-of-freedom discrete systems; weakly nonlinear vibrations; parametric resonance; introduction to Hamiltonian dynamics; rigid-body motions. *Prerequisite:* T A M 212; MATH 285 or 341; MATH 225 or 315. 4 hours or 1 unit.

321. Intermediate Solid Mechanics

Analysis of stress and strain (definitions, transformation of axes, equilibrium equations and symmetry of the stress tensor); linear materials, Hooke's law; strain energy, potential energy, energy principles and methods; two-dimensional problems in elasticity (torsion, axisymmetric problems); the finite-element method for two- and three-dimensional boundary-value problems in linear elasticity; plasticity (introduction, yield criteria, elastic-plastic behavior, limit-load calculations); linear-elastic fracture mechanics (introduction, Griffith's approach, stress intensity factor, energy release rate). *Prerequisite:* T A M 221 and MATH 280. 4 hours. Students may not receive credit for both T A M 321 and A A E 220.

324. Flow and Fracture of Structural Metals

Micromechanisms at the atomic, single-crystal, and polycrystal levels and their use in explaining the deformation and failure characteristics of metals; elastic deformation, dislocation mechanics, plastic deformation and strengthening mechanisms, fracture mechanics and fracture mechanisms, fatigue, creep; design criteria; special topics. *Prerequisite:* T A M 224, CEE 210, MATSE 306, or M E 231; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

326. Experimental Stress Analysis

Basic theories for measuring stresses and deformations in load-carrying engineering components; use of optical, electrical, and mechanical instrumentation; laboratory sessions on brittle coatings, electrical resistance strain gages, photoelasticity, and moiré interferometry. Lecture-lab format. *Prerequisite:* T A M 221. 3 hours or $\frac{3}{4}$ unit.

327. Deformation and Fracture of Polymeric Materials

Same as A A E 327. Mechanical behavior of amorphous and semi-crystalline polymers; overview of polymer structure, properties and processing; polymer linear viscoelasticity using Boltzmann superposition and mechanical models; measurement of viscoelastic properties; polymeric yield phenomena; fracture and craze formation; impact and fatigue. *Prerequisite:* T A M 224, CEE 210 or M E 231; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

328. Mechanical Behavior of Composite Materials

Same as A A E 328. Introduction to the behavior of composite materials and their use in engineering structures: behavior and properties of the constituent fibers and matrices, micromechanical predictions of composite properties, anisotropic elasticity, behavior of composite laminae, classical lamination theory; fracture mechanisms, failure theories; behavior of composite plates and beams. *Prerequisite:* T A M 224, CEE 210 or M E 231; or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

335. Intermediate Fluid Mechanics

Analytical solution methods for problems involving ideal and real fluids: potential flow theory, boundary-layer theory; surface waves, vortex dynamics, and compressible flows. *Prerequisite:* T A M 235, M E 211, or A A E 210; MATH 280. 4 hours or 1 unit.

360. Introduction to Continuum Mechanics

Tensor algebra and analysis; kinematics of continua; mass, force, stress, and the general balance laws of continuum mechanics; introduction to constitutive equations. *Prerequisite:* T A M 221 and MATH 280. 4 hours or 1 unit. Students in Theoretical and Applied Mechanics may not receive graduate credit for this course, except by petition to the Graduate Program Committee.

370. Introduction to Computational Mechanics

Same as CSE 350. Introduction to modern computational mechanics: mappings and iterative methods; stability; convergence; consistency; numerical and symbolic solutions of ordinary and partial differential equations; finite-difference methods; the finite-element method; spectral methods. Applications to problems in solid mechanics, fluid mechanics and dynamics. *Prerequisite:* MATH 285 or 341; and C S 101. 3 hours, or $\frac{3}{4}$ or 1 unit. Graduate students receive 1 unit credit upon successful completion of an additional computational project.

373. Fundamentals of Engineering Acoustics

Same as ECE 373. See ECE 373.

393. Independent Study

Individual studies in any area of theoretical and applied mechanics. *Prerequisite:* Advanced undergraduate or graduate standing; consent of instructor. 1 to 4 hours, or $\frac{1}{4}$ to 1 unit. May be repeated in the same semester to a maximum of 8 hours or 2 units. May be repeated in subsequent semesters to a maximum of 12 hours or 3 units.

400. Seminar

Lectures and discussion on current topics in theoretical and applied mechanics. Required of all graduate students each semester. $\frac{1}{4}$ unit.

414. Advanced Linear Elastodynamics and Vibrations

Same as M E 414. Review of theory of multidegree-of-freedom systems; problems in the free and forced vibration of continuous linear elastic structures—rods, beams, membranes, plates, and three-dimensional solid and fluid bodies; Lagrangian densities, Sturm-Liouville problems, time and frequency domains, damping, Green's functions, elastic waves; propagation and modal analysis; modeling of damping in structures; and response of complex structures. *Prerequisite:* T A M 312, 441, 442 and 451; or equivalent. 1 unit.

417. Stochastic Structural Dynamics

Same as A A E 452. See A A E 452.

425. Advanced Composite Material Structures

Same as A A E 425. See A A E 425.

426. Manufacturing of Advanced Polymer Matrix Composite Materials

Same as A A E, and M E 426. See A A E 426.

429. Theory of Linear and Nonlinear Viscoelasticity

Same as A A E 429. See A A E 429.

431. Fluid Mechanics, I—Inviscid Flow

Dynamics of fluids in the limit of zero viscosity; governing equations of motion, kinematics and vorticity transport; general theory of irrotational flow, including two-dimensional potential flow, the complex potential, and three-dimensional potential flow; applications to thin airfoil theory and free streamline theory; inviscid flows with vorticity. Vortex dynamics; water wave theory; and aspects of inviscid compressible flow. *Prerequisite:* T A M 335 or equivalent; MATH 280; MATH 285 or 341. 1 unit.

432. Fluid Mechanics, II—Viscous Flow

Dynamics of flow in which viscosity is significant or dominant, and the development and use of theoretical and numerical tools for practitioners of modern fluid mechanics; physics of viscous layers that arise in both high- and low-Reynolds-number flows; dimensional analysis, exact solutions to the Navier-Stokes equations; jets and wakes; microhydrodynamics; fluid stability; and an introduction to turbulence. *Prerequisite:* T A M 335 or equivalent; MATH 280; MATH 285 or 341. 1 unit.

436. Instability and Transition to Turbulence

Stability of fluid motion: linearized flow equations and normal-mode analysis, Kelvin-Helmholtz instability, inviscid and viscous theory of parallel shear flow, Squire's and Rayleigh's inflection-point theorems, secondary instability theory; critical layers; boundary-layer stability; Orr-Sommerfeld equations, Tollmien-Schlichting waves; nonparallel theory, centrifugal instabilities, Bénard convection; nonlinear theory and transition to turbulence; bifurcations, Landau's theory; routes to chaos, strange attractors; transition modeling, prediction, and control; boundary-layer receptivity, experimental evidence. *Prerequisite:* T A M 432. 1 unit.

437. Experimental Methods of Fluid Mechanics

Methods and techniques for measurement and analysis of data used in experimental fluid mechanics: signal processing, electronics and electro-optics; fluid mechanical properties; experimental signal processing; random data and signal analysis; analog and digital data processing; dynamic similarity, self-preservation; pressure measurement, thermal anemometry, laser-Doppler velocimetry; flow visualization, particle-image velocimetry. Lecture-lab format. *Prerequisite:* T A M 335, 431, or 432. 1 unit.

438. Turbulence

Instability and origins of chaotic motion in fluid flow; Reynolds averaging and statistical description of turbulence, correlations and spectral dynamics of homogeneous turbulence, anisotropic flows, coherent structures,

inhomogeneous turbulence, transport models, large-eddy simulations. *Prerequisite:* T A M 335 or 432. 1 unit.

439. Turbulence and Complex Flows Seminar

Weekly seminar on current research topics in turbulent and other complex flows: theoretical modeling, numerical analysis, computational techniques, experimental investigations. Recommended for graduate students in fluid mechanics. *Prerequisite:* Graduate standing in engineering, physics, mathematics, or related field. ¼ unit.

441. Mathematical Methods for Engineers, I

Vector and tensor algebra, introduction to complex-variable methods; ordinary differential equations, qualitative questions of existence and uniqueness; analytic solution methods, numerical methods, power-series solution and special functions; eigenvalue problems, Green's functions, Laplace transforms, stability of solutions; engineering applications drawn from mechanics. *Prerequisite:* MATH 280; and MATH 285 or 341. 1 unit.

442. Mathematical Methods for Engineers, II

Continuation of T A M 441. Modeling, inequalities, elements of functional analysis; partial differential equations, existence and uniqueness, second-order equations; hyperbolic conservation laws; numerical methods, eigenfunction expansions, integral transforms, fundamental solutions; engineering applications drawn from mechanics. *Prerequisite:* T A M 441. 1 unit.

445. Advanced Physical Acoustics

Same as ECE 445. See ECE 445.

451. Solid Mechanics, I

Mechanics of elastic deformable bodies, based on the fundamental concepts of modern continuum mechanics: kinematics, balance laws, constitutive equations; classical small-deformation theory; formulation of initial-boundary-value problems of linear elastodynamics and boundary-value problems of linear elastostatics; variation formulations, minimum principles; applications of theory to engineering problems. *Prerequisite:* T A M 221; MATH 280; MATH 285 or 341. 1 unit.

452. Solid Mechanics, II

Continuation of T A M 451. Selected topics in linear elasticity (including St. Venant beam theory and plane problems of elastostatics), plasticity (including yield surfaces, von Mises and Tresca yield criteria, Drucker's stability postulate, J_2 -flow theory, perfect plasticity, limit analysis, and slip-line theory), and fracture mechanics (including linear elastic analysis, fracture criteria for elastic brittle fracture, and elastic-plastic fracture). *Prerequisite:* T A M 451. 1 unit.

458. Wave Motion

Linear waves in one-dimensional homogeneous and inhomogeneous media (both solids and fluids), linear elastic waves in a homogeneous halfspace, scalar waves in a layer and in a layered halfspace, nonlinear diffusive waves, nonlinear dispersive waves and the inverse scattering transform. *Prerequisite:* T A M 441 or

MATH 455 or equivalent; and T A M 414 or 431 or 451. 1 unit.

459. Asymptotics and Singular

Perturbations in Engineering and Physics
Same as MATH, NUC E, and PHYCS 459. Advanced methods of perturbation theory and asymptotic analysis, with examples drawn from classical dynamics, fluid mechanics, and wave propagation: asymptotics of integrals, singular perturbation theory (boundary layers, matched asymptotic expansions, composite expansions), multiple scales, summation of series; special topics. *Prerequisite:* MATH 346 or equivalent; T A M 441 or equivalent; or consent of instructor. 1 unit.

460. Continuum Mechanics

Unified treatment of modern continuum mechanics: mathematical preliminaries; review of kinematics and general balance laws; general theory of mechanical constitutive equations, including material constraints and material symmetry. *Prerequisite:* T A M 451, or consent of instructor. 1 unit.

462. Plasticity

Phenomenological and mathematical formulation of the constitutive laws of plasticity; yield criteria and their experimental verification; plastic stress-strain relations and their associated flow rules; correspondence between rate-independent and rate-dependent plasticity; solutions to basic boundary-value problems, including plane problems and those involving cylindrical and spherical symmetries; variational and minimum principles; limit analysis; plane-strain problems and crystal plasticity; finite-strain theory. *Prerequisite:* T A M 451; T A M 452 or consent of instructor. 1 unit.

470. Advanced Numerical Methods for Computational Fluid Mechanics

Same as CSE 460. Highly accurate and reliable techniques for large-scale numerical simulations of fluid flows: spectral numerical methods, including Fourier and other functional expansions, Galerkin and collocation projections, domain decompositions and the solution of partial differential equations, especially the Navier-Stokes equations; high-resolution methods for the solution of hyperbolic conservation laws with discontinuous solutions, and issues related to implementation on supercomputers. *Prerequisite:* T A M 370 or equivalent; T A M 442 or equivalent; or consent of instructor. 1 unit.

474. Advanced Finite-Element Methods

Same as CSE 417. Advanced theory and applications of the finite-element method, as needed for research in computational science and engineering; applications to mechanics of solids and fluids, thermal problems, etc.; variational foundations of the finite-element method, error estimates and adaptive analysis; finite-element methods for parabolic and hyperbolic problems; mixed finite-element methods; and applications to systems of equations. *Prerequisite:* A A E 320, T A M 370, CEE 478, C S 355, M E 345, or equivalent; or consent of instructor. 1 unit.

485. Fracture Mechanics

Unified analytical treatment of modern fracture problems: macroscopic theories used to determine the static strength of bodies containing cracks; Griffith criterion, linear-elastic fracture mechanics, elastic-plastic fracture mechanics models; small-scale yielding results and their implications; general yielding; interfacial fracture; fracture control; micromechanisms of fracture. *Prerequisite:* T A M 324 or MATSE 340; T A M 441; T A M 451; T A M 452 or consent of instructor. 1 unit.

490. Micromechanical Behavior of Materials

Advanced analysis of modern engineering materials with emphasis on relating microstructural phenomena to the mechanics of material behavior: prediction of elastic and thermal properties of materials with heterogeneous microstructure (such as composites), micromechanics of failure and damage, toughening mechanisms, mechanics of phase transformations; and current topics in materials research (such as high-temperature response and ferroelasticity). *Prerequisite:* Undergraduate course in material sciences; T A M 451. 1 unit.

493. Advanced Independent Study (Special Problems)

Analytical, experimental, or computational studies in one or more areas of theoretical and applied mechanics, including solid mechanics, behavior of materials, fluid mechanics, dynamics, applied mathematics, and computational science and engineering. $\frac{1}{4}$ to 2 units (summer: $\frac{1}{4}$ to 1 unit).

499. Thesis Research

0 to 4 units.

UKRAINIAN

(See Slavic Languages and Literature)

URBAN AND REGIONAL PLANNING

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Urban and Regional Planning (U P)**101. Planning of Cities and Regions**

Survey of city and regional planning as related to problems and programs of urbanization and resource development. 3 hours.

108. Planning Policy and Law

Case methods illustrate basic constitutional, statutory and judicial legal concepts and policy options with which professionals are involved including: environmental, social, and economic planning. 3 hours.

116. Analytical Planning Research Methods

Numerical and statistical analysis of data for planning, forecasting, and decision making. Data and problems framed from planning cases and resulting in professional quality analytical memoranda. Includes use of microcomputer analytical software. 4 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

203. Cities, Regions, and Social Science

Planning implications of economic, geographic, political, and social structure of cities and regions; introduces social science theories to understand and analyze cities and regions. Students use computer simulation and databases to analyze a city or region. *Prerequisite:* U P 101, ECON 102, and U P 116 or equivalent. 3 hours.

205. Ecological Systems in Planning

Basic ecological principles pertinent to planning and management. Examination of problems that arise from inadequate consideration of structure and function of ecological systems, and approaches to ecological restoration and environmentally sound planning. Applications of principles to case studies drawn from urban planning, natural resource management, and sustainable development. 3 hours. Students who have earned credit in EEE 105 may not receive credit in U P 205.

210. Economics of the Environment

Same as ACE, ECON, ENVST, and NRES 210. See ACE 210.

212. Graphic and Written Communication for Planners

Covers the graphic and verbal skills required in effectively communicating planning information and ideas: freehand and computer-based graphics, policy argumentation, integration of verbal and graphic communication. *Prerequisite:* Completion of campus Composition I general education requirement and U P 101 or consent of instructor. 4 hours.

216. Planning Analysis

Provides an introduction to methods for analyzing situations that require a planning response. Methods instructed include systems modeling, benefit-cost analysis, budgetary analysis, decision analysis, and forecasting techniques. *Prerequisite:* U P 116 or an introductory statistics course. 3 hours.

247. Planning Workshop, I

Field work dealing with selected physical and/or social planning problems. *Prerequisite:* U P 205, 212, 260, and 316. 6 hours.

260. Social Inequality and Social Welfare Planning

Examines the state of social welfare programs and planning in the United States and high

correlation between poverty and all forms of discrimination. Includes a description of government programs in aid to the poor and addresses the inequality between blacks and whites. Students are assigned team projects and write individual evaluation papers in areas such as: health care planning, housing homelessness and community organizing, racial discrimination, gender discrimination, and racism on campuses. *Prerequisite:* Sophomore standing; majors in Urban Planning must have taken U P 101. 3 hours.

290. Planning Internship

Professionally supervised field experience in public and private planning or development agencies; designed to introduce students to professional employment and actual planning practice. Students work in a department-approved agency of their own choice either during the summer session or part-time during a regular semester. At least two weeks of full-time employment or its equivalent is required for each semester hour of credit. Summary reports are submitted by both employer and student. *Prerequisite:* Senior standing or consent of instructor. 0 to 6 hours. No more than 8 hours of U P 290 may be applied toward the Bachelor's degree.

297. Special Problems

Special projects, research, and independent reading. *Prerequisite:* Consent of head of department. 2 to 6 hours.

305. Environmental Planning in a Watershed Context

Uses the watershed as the basic organizing concept in environmental planning and management; methods for assessing watershed boundaries, geology, soils, and surface and groundwater system processes. Emphasizes ecological implications of patterns of land use on functional and qualitative aspects of watershed systems. All-day field trip required. *Prerequisite:* U P 205 or equivalent, or consent of instructor. 4 hours or 1 unit.

308. Law and Planning Implementation

Cases, legislation, and materials illustrative of the social, economic, and environmental interrelationships of land-use planning and the dynamic role of law as a system of controlled conflict; traditional and emerging concepts of zoning, subdivision regulation, housing codes, and review procedures. *Prerequisite:* Undergraduates must have senior standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

309. Planning Negotiation

Examination and simulation of negotiation concepts and techniques as an ad hoc or integrated element of a planning process. Case assignments and exercises are used to supplement readings. *Prerequisite:* Upper division or graduate standing. 4 hours or 1 unit.

318. Fundamentals of Geographic Information Systems for Planners

Detailed introduction to the design and use of computerized geographic information systems, focusing on their significance for planning. Emphasizes GIS within an institutional setting, covering not only fundamental technical concepts, but also organizational, man-

agement, and legal issues. Students will be introduced to GIS applications and products through readings, videos, demonstrations, and exercises. Computer laboratory work is included. *Prerequisite:* U P 116, GEOG 185, L A 180, or consent of instructor. 4 hours or 1 unit.

320. Planning for Historic Preservation

Survey of the preservation movement in relation to urban planning; techniques for selection of sites and definition of districts; funding, regulation, and implementation measures; and case studies of preservation plans and programs. *Prerequisite:* At least Junior standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

326. Urban Design and Planning Methods

Concepts and techniques of urban analysis, plan making, and implementation essential for effective interdisciplinary work in urban design; case studies of major types of large-scale projects. *Prerequisite:* Undergraduates must have senior standing. 3 hours, or $\frac{3}{4}$ or 1 unit.

327. Preservation Planning Workshop

Small group field work dealing with application of planning principles and techniques to actual preservation planning problems in a nearby community or area. *Prerequisite:* U P 247, 320, or consent of instructor. 3 to 6 hours, or $\frac{3}{4}$ to 1½ units. May be repeated to a maximum of 12 hours or 3 units.

330. Urban Transportation Planning

Same as CEE 330. Role of transportation in urban development and planning; characteristics of urban-person transportation systems and methods of analysis and forecasting of urban-person transportation demand; transportation systems management and capital improvement programming; and emphasis on the needs and activities of metropolitan planning organizations. 3 hours, or $\frac{3}{4}$ or 1 unit.

341. Land Resource Evaluation

Same as L A 341. See L A 341.

342. Seminar on Environmental Policy and Law

Identification and analysis of environmental issues and legal developments primarily at the state and federal levels. *Prerequisite:* U P 308 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

344. Social Impact Assessment

Same as ENVST, L A, LEIST, NRES, and R SOC 344. See LEIST 344.

345. Urban Economic Development and Fiscal Packaging

Public-private-partnerships in urban economic development, including study of potentials, problems, and projects; financing urban economic development through federal grant programs, tax increment financing and other means. *Prerequisite:* U P 203 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

346. Ecological Numeracy: Planning Analysis of Environmental Issues

Same as GEOG and NRES 346. Course develops skills of estimation, simple calculations, and modeling to understand and participate in the debate about a wide range of environ-

mental issues. Mathematical level does not exceed introductory calculus, but careful analysis is stressed along with limits, indirect effects, efficiency, dynamics and lags, and equity. *Prerequisite:* Two semesters of science and one semester of calculus, or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

347. Land Use Planning Workshop

Small group field work applying principles and techniques to specific land use problems in selected jurisdictions. *Prerequisite:* U P 247 or graduate standing. 4 or 6 hours, or 1 or 1½ units.

348. Environmental Planning Workshop

Small group field work applying planning theory, principles, and techniques to specific environmental problems of selected jurisdictions. *Prerequisite:* U P 247 or graduate standing. 4 or 6 hours, or 1 or 1½ units.

349. Environmental Management and Planning Simulation

Management of environmental resources for a large urban area using computer assisted gaming simulation techniques; focuses on the law, technology, administration, and politics associated with environmentally sensitive decisions that require interrelated responses and development of consistent strategies. *Prerequisite:* U P 308, 342, 401, or consent of instructor. 2 or 4 hours, or $\frac{1}{2}$ or 1 unit.

373. Housing and Urban Policy Planning

The role of housing in American social policy planning; economic modeling of the housing market, emphasizing supply and demand functions and private market imperfections; and analysis of public policies for housing as they affect special consumer groups (the poor, the elderly, and the minorities). *Prerequisite:* U P 260 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

374. Neighborhood Planning

Examines rationale and techniques for planning at the neighborhood level; the major social, political, and economic issues that confound public and private sector efforts to revitalize distressed neighborhoods. *Prerequisite:* U P 260 or equivalent. 3 hours, or $\frac{3}{4}$ or 1 unit.

375. Regional Environmental Management Simulation

Same as ACE 319, CEE 341, ENVST 341, and GEOG 341. See CEE 341.

378. Community Development Workshop

Application of community development principles and techniques to the solution of environmental, economic, and social problems facing low income urban communities. Participants collaborate with neighborhood leaders to produce stabilization plans promoting business development, job generation, housing improvement, and municipal service delivery. Involves small group projects and off-campus field work. *Prerequisite:* For undergraduates, completion of U P 247, and consent of instructor. For graduate students, completion of U P 402, and consent of instructor. 6 hours or 1½ units.

394. Special Topics in Urban and Regional Planning

Seminar on topics of current interest, as announced in the *Timetable*. 2 to 6 hours, or $\frac{1}{2}$ to 1½ units. May be repeated to a maximum of 12 hours or 4 units.

401. Development of American Planning Thought

Promotes an understanding of concepts and principles that have shaped the evolution of Urban and Regional Planning as practiced in the United States during the last two centuries. *Prerequisite:* Graduate standing in Urban Planning. $\frac{3}{4}$ unit.

402. Planning Problems and Cases

Individual and team experiences in solving problems that require creative application of knowledge and of planning processes to all aspects of human settlements; emphasizes professional skills, including graphics, computer analysis, writing, and presentation; also, reviews of planning cases. *Prerequisite:* U P 308, 401, 403, and 405, or equivalent preparation; and concurrent registration in U P 406; or consent of instructor. $\frac{1}{2}$ to 1½ units. May be repeated to a maximum of 1½ units. Approved for S/U grading.

403. Land Use and Site Development Planning

Develop skills and understanding of land use and site development from an environmental and physical perspective within the context of comprehensive planning; including laboratory and field work. *Prerequisite:* Admission to the Master of Urban Planning curriculum or consent of instructor. $\frac{3}{4}$ unit. Concurrent enrollment in other MUP core courses is intended.

404. Urban Structure and Functions

Historical overview of urbanization process, forces, and factors; concepts and models of urban structure; economic, social, and political perspectives; images, visions, and perceptions of urban environments; cities of the world. Includes one-day field trip. *Prerequisite:* Graduate standing in department of Urban Planning. $\frac{3}{4}$ unit.

405. Economic Analysis of Public Plans and Policies

Techniques of policy analysis and evaluation; includes microeconomic concepts, cost-benefit analysis, cost-effectiveness, and planning-programming-budgeting systems; and examines selected public policies in areas such as transportation, environmental control, health, education, housing, and local finance. *Prerequisite:* Consent of instructor. $\frac{3}{4}$ unit.

406. Urban and Regional Analysis

Same as GEOG 406. Economic and demographic analysis of regional growth and change; emphasizes forecasting and impact studies. Topics include data sources, economic base studies, population estimation and projection, economic impact analysis, and employment projection; practical application of methods to a study area. *Prerequisite:* Introductory statistics such as SOC 185 or GEOG 185 or consent of instructor. $\frac{3}{4}$ unit.

417. Community Studies Theory

Same as HCD, and SOC 417. See HCD 417.

419. Information Management and Spatial Analysis with GIS

Advanced course in geographic information systems emphasizing application of GIS to problems involving spatial analysis. Building upon fundamental concepts, students learn to use GIS software frequently found in planning practice. Also prepares students to use GIS in research requiring management and analysis of geographic data. Extensive use of computing workstations. *Prerequisite:* UP 318 or consent of instructor. 1 unit.

440. Public Involvement in Resource Management and Environmental Planning

Same as ENVST, LA, LEIST, NRES, and R SOC 440. See NRES 440.

445. Spatial Design Methods

Same as LA 442. See LA 442.

446. Land Use Policy and Planning

Examines a variety of approaches to land use policy and planning, from both a theoretical and an applied perspective. Explores different values in American land use policy, recent evolution of land use policy. Taught as a seminar. *Prerequisite:* Previous course or experience in land use, urban, or environmental planning, or consent of instructor. 1 unit.

456. Regional Science Methods: Economic and Demographic

Same as GEOG 456. See GEOG 456.

457. Seminar in Regional Science

Same as GEOG 457. See GEOG 457.

480. Advanced Planning Theory

Recent advances in planning, policy-making, and decision-making theories as they relate to the efficient use of land and to the complex interrelationships among the major uses of land, i.e., housing, transportation, agriculture; specific applications vary annually, reflecting the students' dissertation research topics. *Prerequisite:* UP 401, 403, and 404; or equivalents. 1 unit.

483. Historical Ecology of Human Settlements

Same as GEOG and LA 483. Explores the reciprocal relationship between human settlement and ecology as a basis for planned change. Combines scientific and historical accounts of ecosystems; analyzes the historical interaction of land use change and the ecology of aquatic and terrestrial ecosystems. Focuses on Illinois and the Midwest; includes role of Native Americans and European settlers in midwestern ecosystems and the importance of gender and race in examining society and ecological change. *Prerequisite:* Graduate standing and consent of instructor. 1 unit.

485. Advanced Formal Modeling in Planning

Seminar on formal models used to analyze planning problems and planning behavior. Includes static and dynamic, linear and nonlinear, and deterministic and stochastic optimization models. Derivations of models

and methods for solution treated in depth, but the emphasis is on applications to planning problems such as transportation, land use, and environmental management. Specific themes change from year to year. *Prerequisite:* UP 405 and 406, or consent of instructor. 1 unit.

487. Qualitative Research Methodology

Same as GEOG 487. Students use individual research to practice qualitative methods of studying social interaction. Includes field research and historical/archival research methods; project areas include community development, environment, and landscape. Discussion is divided between 1) readings on issues such as techniques and research design, social theory, ethnocentrism, and combining qualitative with quantitative research and 2) student research reports. *Prerequisite:* Consent of instructor. 1 unit.

490. Professional Internship

Summer, part-time, or other professional-level employment in the field of planning, usually in an area of concentration; exposure to the social, political, and institutional setting in which planning operates; and full documentation of internship activities required. *Prerequisite:* Consent of instructor. 0 units.

494. Seminar

Selected topics in urban and regional planning; several sections each semester. *Prerequisite:* Consent of instructor. 1 unit.

497. Urban Planning Research

Independent study in selected urban and regional planning topics. *Prerequisite:* Consent of instructor and head of the department. ¼ to 1 unit. No more than 4 units may be applied toward the Master of Urban Planning degree.

498. Master's Project

Major independent or small-group project, conducted in lieu of a master's thesis. *Prerequisite:* Consent of instructor. 1½ units.

499. Thesis Research

Prerequisite: Graduate standing in urban and regional planning; consent of the head of the department. 0 to 4 units.

VETERINARY BIOSCIENCES

Head of Department: David R. Gross
Department Office: 516 Veterinary Medicine Basic Sciences Building, 2001 South Lincoln Avenue, Urbana
Phone: 333-2506

Veterinary Biosciences (V B)**200. An Introduction to Gross Anatomy**

Same as ANSCI 247. Study of mammalian gross anatomy, by lecture and laboratory dissection of the near-term fetal pig, designed for pre-medicine, pre-dentistry, and pre-

veterinary, allied and applied health and medical students. *Prerequisite:* BIOL 120 or equivalent, or consent of instructor. 4 hours.

201. Cat-Human Gross Anatomy

Weekly lab-discussion explaining and demonstrating the essential differences between cat and human gross anatomy. *Prerequisite:* BIOL 120 or equivalent, or consent of instructor. 1 hour. Concurrent registration in V B 200 is required.

300. Gross Anatomy, I

The systemic and topographic study of the anatomy of the dog with special reference to cat and exotics, as it relates to veterinary medicine, by lecture and discussion-laboratory dissection. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 5 hours or 1¼ unit.

301. Veterinary Histology

Lecture-laboratory consideration of basic microscopy, cytology, and histology of tissues and the major organ systems of domestic and laboratory animals. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 5 hours or 1¼ unit.

302. Gross Anatomy, II

Study of the systematic and topographic anatomy of the large domestic animals, including reference to diagnostic and surgical procedures, by lecture and dissection laboratory. *Prerequisite:* V B 300 or consent of instructor. 4 hours or 1 unit.

305. Veterinary Developmental Anatomy

Lecture-discussion of the development of domestic animals from fertilization through organ formation. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 2 hours or ½ unit.

306. Veterinary Orthopedic Biomechanics

Same as BIOEN 306. Explores the relationship between the biology and mechanics of the musculoskeletal system and its role in the pathobiology and treatment of orthopedic diseases utilizing the techniques of morphology and mechanical engineering; interdisciplinary course for both life science and engineering students. *Prerequisite:* BIOL 122 and PHYS 101, or equivalents; or consent of instructor. 3 hours or ¾ unit.

307. Comparative Gross Anatomy of Caged, Laboratory, and Exotic Vertebrates

Lecture and laboratory-discussion of the topographical anatomy of caged, laboratory, and exotic vertebrates more commonly seen by veterinarians. *Prerequisite:* V B 300 and 302, or consent of instructor. 2 or 3 hours, or ¼ or ½ unit.

310. Neurobiology

Introduction to the science of neurobiology, both neuroanatomy and neurophysiology and their importance to an understanding of the normal integrative nervous system of domestic and laboratory animals. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 3 hours or ¾ unit.

311. Aquatic Animal Medicine

Course covers the biology and medicine of representative aquatic animals including: cetaceans, crocodilians, Florida Manatee, freshwater and marine fish and invertebrates, sea turtles, pinnipeds, and sharks. Special emphasis is placed on extended off-campus (3 weeks) field trips and student interactions with aquatic animal medicine professionals. *Prerequisite:* Senior standing in professional veterinary curriculum. 2½ hours. Approved for S/U grading.

315. Physiology, I

Lecture-discussion and laboratories on the physiology of the endocrine, reproductive, and renal systems. *Prerequisite:* First-year standing in the veterinary curriculum or consent of instructor. 4 hours or 1 unit.

316. Physiology, II

Lecture-discussion and laboratories: Physiology of cardiovascular, respiratory and gastrointestinal systems, acid-base balance, and cardiopulmonary aspects of exercise in domestic animals. *Prerequisite:* Admission to the veterinary professional curriculum or consent of the instructors. 4½ hours.

318. Pharmacology, I

Lecture-discussion on the general principles of pharmacology and analysis of the action of chemical agents on physiological processes. *Prerequisite:* For professional students, second-year standing in the veterinary curriculum. 2½ hours.

319. Pharmacology, II

Lecture-discussion on the action of chemical agents on physiological processes and disease-producing organisms. *Prerequisite:* V B 318 or equivalent. 3 hours or ¾ unit.

320. Toxicology

Discusses the mechanisms of action, clinical, diagnostic, and therapeutic aspects of chemical and plant toxicants in domestic animals. *Prerequisite:* V B 319 or equivalent. 2 hours or ½ unit.

323. Veterinary Thanatology—Grief Management in Veterinary Medicine

Comprehensive study of veterinary thanatology, as it relates to the chronic care manage, terminal illness and/or death of a companion animal. The psychosocial dynamics of thanatology relative to human grief and bereavement, with an emphasis on professional stress management for the care-giver. 1 hour.

324. Nutritional Aspects of Large Animal Medicine

Clinical aspects of nutritional deficiencies, imbalances, and toxicities in cattle, horses, sheep, and swine; presentation of therapeutic principles; and nutritional aspects of the etiology, prevention, and treatment of specific disease conditions. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor. 2 hours.

326. Nutritional Aspects of Small Animal Medicine

Clinical aspects of nutritional deficiencies, imbalances, and toxicities in small animals;

presentation of therapeutic principles; and nutritional aspects of the etiology, prevention, and treatment of specific disease conditions. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor. 1 hour.

329. Advanced Veterinary Toxicology—Small Animals

Lecture/discussion and laboratory course which focuses on differential diagnosis of toxicants which commonly affect small animals, grouped based on toxicant types (insecticides, human drugs, metals, poisonous plants, others). Emphasizes therapeutic considerations, including lavage, as well as field investigation methods. *Prerequisite:* V B 320 or equivalent, or consent of instructor. 1 hour or ¼ unit.

330. Advanced Veterinary Toxicology—Large Animals

Lecture/discussion and laboratory course which focuses on differential diagnosis of toxicants which commonly affect large animals, grouped based on toxicant types (insecticides, feed additives, metals, plants, mycotoxins, others). Emphasizes therapeutic procedures, and residues in foods of animal origin. Includes field investigation and detoxification procedures. *Prerequisite:* V B 320 or equivalent, or consent of instructor. 1 hour or ¼ unit.

331. Introduction to Poisons in Plants and Plant-Derived Materials

Focuses on identification and toxicology of poisonous plants as well as mycotoxins and pesticides that may contaminate plant materials. Includes wild, ornamental, and food-producing plants. Involves field trips both on and off campus. *Prerequisite:* Enrollment in the veterinary medical curriculum or consent of instructor. 1 or 2 hours, or ¼ or ½ unit. For the higher credit, students must submit an additional proposal paper.

333. Pesticide Toxicology

Same as ENVST 333. See ENVST 333.

349. Basic Toxicology

Same as CPSC, ENVST 349, and FSHN 380. See FSHN 380.

352. Scanning Electron Microscopy Laboratory

Same as BIOL 352. See BIOL 352.

353. Transmission Electron Microscopy Laboratory

Same as BIOL 353. See BIOL 353.

360. Transmission Electron Microscope Optics and Operation

Same as CPSC 360. Introduction to basic principles, applications, and operation of the transmission electron microscope to students in the life sciences, agriculture, veterinary medicine, and related fields. The course is designed to give a thorough understanding of the fundamental principles and operation of the transmission electron microscope. *Prerequisite:* Junior standing and six hours of life sciences, or consent of instructor. 2 hours or ½ unit.

361. Specimen Preparation for Transmission Electron Microscopy

Same as CPSC 361. Theory and practice of biological specimen preparation for transmission electron microscopy. The course is designed to expose and allow the students to experience the numerous methodologies used in the preparation of biological specimens for transmission electron microscopy and present the rationale for choosing specific and appropriate procedures. *Prerequisite:* Junior standing and six hours of life sciences, or consent of instructor. CHEM 102 is highly recommended. 2 hours or ½ unit.

367. Radiology and Radiobiology

Same as V C M 367. See V C M 367.

378. Veterinary Clinical Orientation

Same as V C M and VP 378. See V C M 378.

392. Special Problems

Individual research on a special problem chosen in consultation with the instructor and department head. *Prerequisite:* Registration in veterinary curriculum with GPA of 4.0 or above, or consent of instructor. 1 to 3 hours, or ¼ to ¾ unit. May be repeated to a maximum of 6 hours or 1½ units.

394. Veterinary Bioscience

Basic and applied study including orientation and research on pertinent initial and continuing problems for veterinary medical students. These studies are elective to the CVM professional curriculum. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 1 to 3 hours. May be repeated to a maximum of 6 hours.

412. Advanced Endocrinology

Same as ANSCI and PHYSL 412. See PHYSL 412.

414. Neurotoxicology

Same as ENVST and PSYCH 414. Examines toxic responses of the mammalian nervous system to xenobiotics (therapeutic agents, drugs of abuse, toxins, environmental and industrial chemicals) from the molecular and cellular levels to the behavioral level. Also covers neuroteratology, sensitive periods for neurotoxicity, and the potential role of environmental factors/xenobiotics in the etiology of nervous system disorders. *Prerequisite:* Credit or concurrent registration in BIOCH 350 or 352, and V B 310 or equivalent. ¾ unit.

416. Developmental Toxicology

Same as ENVST 416. See ENVST 416.

431. Advanced Reproductive Endocrinology

Same as ANSCI and PHYSL 431. See ANSCI 431.

432. Advanced Reproductive Physiology

Same as ANSCI 432. See ANSCI 432.

433. Laboratory Methods in Reproductive Physiology

Same as ANSCI and PHYSL 433. See ANSCI 433.

450. Detection and Analysis of Specific Gene Transcripts: A Practical Laboratory Course

Gives participants the background information and hands-on experience in the methodologies necessary to utilize cloned genes for the detection and quantitation of specific mRNA transcripts in RNA extracted from tissue or cell culture samples. Methodologies covered will include: recombinant plasmid propagation, cDNA probe isolation and isotopic labeling, RNA isolation, Poly A+ mRNA selection, gel separation and transfer of RNA to a membrane (Northern blot), hybridization of specific gene probes to membrane bound RNA (Northern hybridization), detection and quantitation of hybridization signal. These basic methodologies are widely applicable to different experimental systems. They allow an investigator to monitor the effects of physiological manipulations, to animals or cultured cells, at the molecular level. *Prerequisite:* Consent of instructor. *1 unit.*

461. Analytical Methods: Analysis of Drugs in Biological Fluids

Review of methods used in the detection of drugs/metabolites and toxins in biological fluids and tissues; emphasis on current laboratory methods and procedures (spectrophotometry, chromatography, immunoassay, sample preparation, method validation) used in various aspects of pharmacologic/toxicologic research requiring quantitation of drugs/toxins. *Prerequisite:* Consent of instructor. *1 unit.*

463. Radioisotopes in Biological Research: Principles and Practice

Variable credit course consisting of two parts: (1) The first half is a practical study of the radioisotopes most commonly used in biological and chemical research, including procedures for their safe handling; (2) The last half of the course covers examples of radioisotope applications in biology and medicine. *Prerequisite:* Quantitative chemistry; one year each of mathematics, physics and biology, or consent of instructor. $\frac{1}{2}$ or 1 unit ($\frac{1}{2}$ unit for first seven weeks of course; 1 unit for entire 15 week course).

464. Comparative Clinical Pharmacology

Lecture-discussion of the clinical use in animals of human and veterinary drugs, including current literature review on pharmacodynamic species differences, novel indications, and contrast of therapeutic alternatives. *Prerequisite:* DVM or equivalent, or consent of instructor. $\frac{3}{4}$ unit.

465. Comparative Disposition of Xenobiotics

Lecture-discussion concerning the fate of foreign chemicals in various species of animals; principles of absorption, distribution, biotransformation, and excretion of drugs and toxicants; and pharmacokinetics and factors which modify these processes. *Prerequisite:* BIOCH 353 and V B 320, or equivalent. *1 unit.*

466. Comparative Environmental Toxicology and Drug Resistance

The chemistry, action, and disposition of selected toxic substances at levels associated

with environmental contamination; nature and biological consequences of host-toxicant interactions from the perspective of chronic and subclinical effects. *Prerequisite:* V B 465 or ENVST 331; or consent of instructor. $\frac{3}{4}$ unit.

467. Principles of Drug and Toxicant Evaluation

Comprehensive discussion of the factors involved in the development of new drugs, the evaluation of drug safety and efficacy, and the analysis of the results of clinical trials. *Prerequisite:* V B 318, 349, or equivalent; and credit or concurrent registration in CPSC 340 or BIOL 371. $\frac{3}{4}$ unit.

490. Seminar

Required of all graduate students whose major is veterinary biosciences. *0 or $\frac{1}{4}$ unit.*

492. Special Problems

Basic and applied study including orientation and research on pertinent initial and continuing problems in the student's area of interest. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit.

496. Interdisciplinary Toxicology Seminar

Same as ENVST and VP 496. See VP 496.

499. Thesis Research

Individual direction of research and thesis writing. *0 to 4 units.*

VETERINARY CLINICAL MEDICINE

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 html#vcm

Veterinary Clinical Medicine (V C M)**301. Clinical and Laboratory Practice**

Clerkship in veterinary clinical medicine and surgery for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. Some sections may require the consent of the instructor. *2½ hours.* May be repeated to a maximum of 10 hours.

302. Clinical Anesthesiology

Clerkship in clinical anesthesiology for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

303. Diagnostic Imaging

Clerkship in Diagnostic Imaging for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

304. Equine Medicine and Surgery

Clerkship in Equine Medicine and Surgery for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

305. Food Animal Medicine and Surgery

Clerkship in Food Animal Medicine and Surgery for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

306. Production Medicine/Therigenology

Clerkship in Production Medicine/Therigenology for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

307. Small Animal Surgery

Clerkship in Small Animal Surgery for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

309. Small Animal Internal Medicine

Clerkship in Small Animal General Medicine for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

310. Specialty Medicine

Clerkship in Cardiology, Dermatology, Oncology, and Neurology for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum. *2½ hours.* May be repeated to a maximum of 12½ hours.

315. Clinical Ophthalmology

An elective clerkship in clinical ophthalmology for VM-4 professional students. *Prerequisite:* Fourth-year standing or equivalent in veterinary medicine professional curriculum and with prior consent of the instructor. *1 to 2½ hours.* May be repeated in the same or separate semesters to a maximum of 10 hours. Approved for S/U grading only.

323. Problem Based Learning in Oncologic Medicine

Case-based approach to veterinary cancer medicine. Small group discussion sessions will allow students to diagnose and prescribe treatment for patients presented with commonly occurring malignancies. *Prerequisite:* Senior veterinary students or consent of instructor. *1 hour or $\frac{1}{4}$ unit.*

325. Exotic Animal Health and Husbandry

Basic health, husbandry, nutrition, handling, and restraint techniques for exotic animals which veterinarians are likely to encounter in private practice. Each topic area will be covered through lecture, with a laboratory section when feasible. Field trips will include a local pet store, the Shedd Aquarium, and a

Chicago zoo. *Prerequisite:* Third or fourth-year standing in veterinary curriculum. 2 hours.

327. Practice Management for Veterinarians
Principles of managing a private veterinary practice including practice evaluation, financing, legal formats for owning and operating a practice, economics, personnel management, accounting and record keeping, and marketing. *Prerequisite:* Third- or fourth-year standing in veterinary curriculum. 1 hour.

330. Companion Animal Medicine, I
Pathophysiology, diagnosis, treatment, and prophylaxis of diseases of the eye and nervous system. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 2 hours.

331. Companion Animal Medicine, II
Pathophysiology, diagnosis, treatment, prophylaxis of infectious diseases, endocrine disorders, diseases of the skin, and gastrointestinal diseases. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 3 hours.

332. Companion Animal Medicine, III
Pathophysiology, diagnosis, treatment, and prophylaxis of diseases of bloodforming organs, and of the cardiovascular, respiratory, and urinary systems. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 3 hours.

333. Companion Animal Medicine, IV
Pathophysiology, diagnosis, treatment, and prophylaxis of diseases of horses and caged birds. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 2 hours.

334. Food Animal General Medicine and Herd Health Management
Diagnosis, treatment, and prevention of infectious and management related diseases of food animals. *Prerequisite:* Third-year standing in Veterinary Medicine. 5 hours.

335. Advanced Veterinary Cardiology
Emphasizes the application of electrocardiography and various cardiac imaging modalities (echocardiography, angiography) for the evaluation of companion animals with cardiovascular disease. *Prerequisite:* Credit or concurrent enrollment in V C M 332. 1 hour.

340. Avian Medicine and Surgery
Diagnosis, pathophysiology, and treatment of medical and surgical diseases in companion birds. *Prerequisite:* V C M 325. 1½ hours.

344. Introduction to Concepts of Swine Herd
Elective course which introduces sophomore veterinary students to the swine industry and herd health. Sixteen lecture-group discussion hours. *Prerequisite:* Second-year standing in veterinary curriculum. 1 hour.

348. Veterinary Cytopathology
Same as VP 348. See VP 348.

349. Horse Behavior Management
Prerequisite: First- or second-year veterinary student status or consent of instructor. 2 hours. Approved for S/U grading only.

350. Clinical Small Animal Dentistry
Clerkship in small animal dentistry for VM-4 professional students. Students will assist in the diagnosis and treatment of dogs and cats with dental disease. The psychomotor skills laboratory will be available for students practicing dental procedures on models and frozen specimens. *Prerequisite:* Fourth-year standing or equivalent in veterinary professional curriculum and with prior consent of instructor. 1 to 2 hours. May be repeated in the same or subsequent semesters to a maximum of 4 hours.

351. Introduction to Surgery
Surgical principles including sterile technique, hemostasis, tissue handling, and wound healing with emphasis on clinical application in domestic animals; laboratory covers demonstrations and practice of surgical principles. *Prerequisite:* Third-year standing in veterinary curriculum. 1 hour.

352. General Small Animal Surgery
Surgical procedures of major body systems, emphasizing preoperative, operative, and postoperative patient care, together with appropriate laboratory practice. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor; V C M 351. 1½ hours.

353. General Large Animal Surgery
Surgical procedures of major body systems, emphasizing preoperative, operative, and postoperative patient care, together with appropriate laboratory practice. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor; V C M 351. 1½ hours.

354. Special Small Animal Surgery
Lecture and clinical demonstrations on surgical diseases and their diagnosis, operative treatment, and after care, together with appropriate laboratory practice. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor; V C M 352. 2½ hours.

355. Special Large Animal Surgery
Lecture and clinical demonstrations on surgical diseases and their diagnosis, operative treatment, and after care, together with appropriate laboratory practice. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor; V C M 353. 2½ hours.

357. Equine Podiatry
Pathophysiology, diagnosis, treatment, and prevention of diseases of the equine foot; material presented in a patient discussion/problem-solving format. *Prerequisite:* V C M 355. 1 hour or ¼ unit.

362. Clinical and Laboratory Practice
Clinical and laboratory practice in diagnosis, treatment, and prophylaxis of animal diseases; lectures, quizzes, and demonstrations. *Prerequisite:* Third-year standing in veterinary curriculum. 2 hours.

363. Small Animal Dermatology
First half of the course presents a systematic approach to small animal dermatologic diagnoses and therapeutics; the second half deals with immunological disorders, seborrheic syndromes, hereditary disorders, cutaneous neoplasms, and feline dermatology. *Prerequisite:* V C M 331 or equivalent, or consent of instructor. 1 hour.

366. Clinical and Laboratory Practice
Clinical and laboratory practice in diagnosis, treatment, and prophylaxis of animal diseases. *Prerequisite:* Third-year standing in veterinary curriculum. 2 hours.

367. Radiology and Radiobiology
Same as V B 367. General principles of radiology and radiobiology techniques and application to the diagnosis and therapy of animal diseases; lectures and discussions. *Prerequisite:* Third-year standing in veterinary curriculum or consent of instructor. 3 hours.

371. The Evolution and Principles of Surgery
Studies the evolution of surgery from an empiric craft to a scientific discipline. *Prerequisite:* Second-year standing in veterinary curriculum. 1 hour.

372. Veterinary Jurisprudence
Principles of law of importance to members of the veterinary profession; animal disease and related regulatory laws and their administration; and federal procedure under animal disease, food, and meat inspection laws. *Prerequisite:* Second-year standing in veterinary curriculum. 1 hour.

373. Small Animal Urology
Anatomic and physiologic basis for urologic examination of the dog and cat; discussions integrate lesions, pathogenesis, and signs of disease and stress the pathophysiologic basis of diagnosis and therapy in small animal urology. *Prerequisite:* V C M 332 or consent of instructor. 1 hour or ¼ unit.

375. Theriogenology
Examines principles of animal reproduction, fertility, and obstetrics of all species of domestic animals, emphasizing farm animals; lectures, discussion, and laboratory practice in obstetrics, pregnancy diagnosis, and male and female infertility. *Prerequisite:* Third-year standing in veterinary curriculum. 4 hours.

376. Veterinary Anesthesiology and Fluid Therapy
Principles of veterinary anesthesiology emphasizing clinical application of anesthetic techniques and procedures in domestic animals; clinical pharmacology of preanesthetic, anesthetic and related drugs, anesthetic and physiologic monitoring equipment, and shock; teaches fluid and electrolyte therapy with overall emphasis on maintenance of homeostasis in anesthetized animals. *Prerequisite:* Third-year standing in veterinary curriculum. 2 hours.

377. Disease Prevention and Therapy in Swine Production

Course designed to introduce senior veterinary students to practices and procedures used in swine practice. Critical analysis of the various phases of pork production, economic requirements and current production problems will be addressed, with special emphasis on the veterinarian's role in herd and the swine industry. Lectures, laboratories, and field trips. *Prerequisite:* Fourth-year standing in veterinary curriculum. 2 hours.

378. Veterinary Clinical Orientation

Same as V B and VP 378. Lectures and discussions involving case material illustrating the interrelationships between the basic sciences and their applications in medicine and surgery. *Prerequisite:* First-year standing in the veterinary curriculum. 1 hour.

379. Advanced Veterinary Ophthalmology

Anatomic, physiologic, pathologic, and pharmacologic considerations in eye diseases and their treatments; instrumentation and methods of study of ocular structure, physiology, and diseases; and laboratories devoted to techniques of examination of the eye and surgical procedures used in treatment of eye diseases. *Prerequisite:* Fourth-year standing in veterinary curriculum. 1 or 2 hours (1 hour if taking lecture only; 2 hours if taking lecture and lab), or $\frac{3}{4}$ unit.

380. Dairy Herd Health Management

Study of dairy cattle practice, including economics, enterprise, management, herd and individual cow health, reproduction, and disease control. *Prerequisite:* Third-year standing in veterinary curriculum. 1 hour.

381. Advanced Equine Internal Medicine

Advanced instruction in case management, laboratory data interpretation, decision-making regarding therapeutics, and advanced diagnostic techniques. *Prerequisite:* V C M 333 or consent of instructor. 1 or 2 hours, or $\frac{1}{4}$ or $\frac{1}{2}$ units.

382. Exotic Pets

Principles of restraint, diagnosis, and medical and surgical treatment of diseases of small exotic mammals, reptiles, and fish kept as pets. *Prerequisite:* Fourth-year standing in veterinary curriculum. 1 hour.

383. Advanced Soft Tissue Surgery

Advanced instruction in the pathophysiology, diagnosis and treatment of soft tissue surgical disorders of the small animal patient. Lectures will incorporate clinical case presentations and discussion. The laboratory sessions will be used to teach surgical procedures which are commonly performed in small animal clinical practice and which are not taught in the core curriculum. *Prerequisite:* Concurrent registration in V C M 354. 1 hour.

384. Client Relations

Introduction to client relations, including techniques of effective verbal and nonverbal communication and applications of these techniques for veterinary students. 1 hour.

385. Advanced Radiographic Interpretation: Large Animal

In-depth study of radiographic diagnosis applied to large animals, primarily equine; lecture, case study, and discussion centering on anatomic areas, e.g., foot, fetlock, metacarpus/metatarsus, carpus, tarsus, upper limb joints, and head and neck. *Prerequisite:* V C M 367 or equivalent. 2 hours.

386. Advanced Radiographic Interpretation—Small Animal

Exercise in systematic interpretation of small animal radiographs. *Prerequisite:* V C M 367 or equivalent. 2 hours.

387. Advanced Veterinary Anesthesiology

Lectures cover mechanical ventilators and the physiologic effects of mechanical ventilation on acid-base status, cardiopulmonary function and other homeostatic mechanisms in anesthetized animals; high frequency ventilation in relation to other forms of mechanical respiratory support; recently developed anesthetic agents, techniques, and their clinical applications; interactions between non-anesthetic drugs and their effects on surgical patient response to anesthetic and anesthetic-related agents. *Prerequisite:* Fourth-year standing in veterinary curriculum or consent of instructor. 1 hour or $\frac{1}{4}$ unit.

388. Human Interactions with Nonhuman Animals—Issues and Answers

Study of human interaction with, behavior toward, and treatment of nonhuman animals. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 1 hour.

389. Small Animal Diagnostic Instrumentation

Training in the use of special medical and surgical diagnostic techniques, including endoscopy, and various biopsy techniques. *Prerequisite:* Fourth-year standing in veterinary curriculum. 1 hour.

391. Advanced Orthopedics: Fracture Fixation

Advanced instruction in the pathophysiology of bone fracture and healing, techniques of fracture fixation, and complications of fracture repair. *Prerequisite:* V C M 354; third-year standing in the veterinary curriculum. 1 hour.

392. Special Problems

Individual research on a special problem chosen in consultation with the instructor and department head. *Prerequisite:* Registration in veterinary curriculum with GPA of 3.0 or above, or consent of instructor. 1 to 3 hours, or $\frac{1}{4}$ to $\frac{3}{4}$ units. May be repeated to a maximum of 6 hours or 1 unit.

394. Veterinary Clinical Medicine

To be used to designate a trial or experimental course for five or more students, designed to be an elective in the CVM professional curriculum. The course can be taught under this designation for two years or two offerings, whichever time is greater. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 1 to 3 hours. May be repeated to a maximum of 6 hours.

395. Beef Cattle Economics, Management, and Herd Health

Study of management systems and the economic factors that influence the cattle industry; health programs for beef cattle emphasizing the herd approach and the veterinarian's role in the beef cattle industry. *Prerequisite:* Fourth-year standing in veterinary curriculum. 1 hour.

398. Advanced Small Animal Dentistry

Recognition and appropriate treatment of various types of feline and canine dental diseases will be discussed. The laboratories will be utilized to assist students in the determination of the appropriate diagnosis based on dental radiographs, photographs, and models. Oral surgery, periodontic, and endodontic therapy will also be performed in the laboratory. *Prerequisite:* V C M 352. 1 hour, or $\frac{1}{4}$ unit.

399. Special Senses

Studies the structure, development, and function of the eye and ear; discusses specific pharmacologic agents and selected anatomical abnormalities which alter normal physiologic processes. *Prerequisite:* Registration in the veterinary curriculum. 1 hour.

400. Difficult Case Conference

House Officers (Clinicians in Training) will present clinical cases presented to the Veterinary Medicine Teaching Hospital in a lecture/discussion format with supporting literature. Analysis of decisions and clinical interpretation will be the focus of the discussion. *Prerequisite:* DVM degree and graduate status in the College of Veterinary Medicine, or consent of instructor. $\frac{1}{4}$ unit. May be repeated in separate semesters as topics vary to a maximum of 3 units.

411. Seminars in Production/Population Medicine

Same as VP 411. See VP 411.

422. Advanced Topics in Comparative Theriogenology

Advanced study on the principles and practice of theriogenology in domestic and non-domestic animals. *Prerequisite:* DVM or equivalent and consent of instructor. $\frac{1}{4}$ unit. May be repeated in separate semesters to a maximum of $1\frac{1}{2}$ units.

451. Introduction to Surgery for Research

Surgical principles including sterile technique, hemostasis, tissue handling, instrumentation, and wound closure and healing are taught with emphasis on application in domestic and laboratory animals. Laboratory covers demonstration and practice of surgical principles. *Prerequisite:* Graduate standing or consent of instructor. $\frac{1}{4}$ unit. Students may not receive credit for both this course and V C M 351.

477. Recent Advances in Large Animal Internal Medicine

Seminar series devoted to intense study of pathophysiologic and current therapeutic aspects of selected topics in large animal internal medicine. *Prerequisite:* DVM degree or equivalent or consent of instructor. $\frac{1}{4}$ unit. May be repeated to a maximum of $1\frac{1}{2}$ units.

484. Current Concepts in Comparative Surgery

Advanced study of topics concerning the pathophysiology, diagnosis, and current therapy of diseases which are treated with surgical procedures. *Prerequisite:* DVM or equivalent or consent of instructor. $\frac{1}{4}$ unit. May be repeated to a maximum of 1 unit.

488. Advances in Veterinary Dermatology

Series of lectures, seminars, and discussions devoted to the intense study of pathophysiologic aspects of the integument and related systems including: structure and functions, endocrinology, immunology, microbiology, virology, parasitology, pharmacology, oncology, and miscellaneous disorders. Students enrolling for $\frac{1}{2}$ unit credit will also participate in weekly critiques of current literature. *Prerequisite:* DVM degree or equivalent and consent of instructor. $\frac{1}{4}$ or $\frac{1}{2}$ units. May be repeated to a maximum of 2 units. Duplicate registration is permitted up to 1 unit.

490. Seminar

Required of all graduate students whose major is Veterinary Clinical Medicine. 0 or $\frac{1}{4}$ units.

491. Recent Advances in Veterinary Internal Medicine

Series of lectures, seminars, and discussions devoted to intense study of new pathophysiologic aspects of selected topics in veterinary internal medicine. Each semester is devoted to three topics. *Prerequisite:* DVM degree or equivalent, and consent of instructor. 0 or $\frac{1}{4}$ units. May be repeated to a maximum of $1\frac{1}{2}$ units.

492. Special Problems

Basic and applied study including orientation and research on pertinent initial and continuing problems in the student's area of interest. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit.

493. Advanced Topics in Veterinary Clinical Medicine

Instruction in advanced diagnosis, therapeutic modalities, and research methodologies in the areas of small animal internal medicine, small animal surgery, equine and food animal medicine and surgery, ophthalmology, theriogenology, radiology, and clinical pharmacology. *Prerequisite:* DVM degree or equivalent; consent of instructor. $\frac{1}{4}$ to 1 unit. May be repeated to a maximum of 2 units.

499. Thesis Research

0 to 4 units.

Veterinary Pathobiology (VP)

290. Undergraduate Research

Laboratory and/or field studies selected in consultation with a faculty mentor. *Prerequisite:* Consent of instructor. 1 to 5 hours. May be repeated in subsequent semesters to a maximum of 10 hours.

310. Immunogenetics and Immunophysiology

Same as ANSCI and BIOL310. See ANSCI 310.

316. Ecological Parasitology

Same as EEE 316. See EEE 316.

326. Parasitologic Techniques and Systematics

Survey of taxonomy of animal parasites; structures used for taxonomy are studied after collection, preservation, and preparation of parasite specimens. *Prerequisite:* VP 333 or equivalent. 3 hours or $\frac{3}{4}$ unit.

330. Veterinary Medical History, Ethics, and Orientation

Introduction to the history, recent developments, scope, and trends of veterinary medical education, practice, research, public health, and other areas; functions, obligations, and organization of the profession. *Prerequisite:* First-year standing in veterinary curriculum. 1 hour.

331. Veterinary Bacteriology and Mycology

Studies the properties of bacteria and fungi responsible for diseases of domestic and wild animals; emphasizes epidemiology, pathogenesis, morphological and cultural characteristics of bacteria and fungi, and diagnosis. *Prerequisite:* First-year standing in veterinary curriculum or consent of instructor. 4 hours or 1 unit.

332. Veterinary Immunology

Fundamental principles of immunology; mechanisms and functions of the humoral and cell-mediated immune responses; role of the immune system in protection against infectious diseases and tumors; immune dysfunctions and diseases of immunologic origins. Lectures and laboratory. *Prerequisite:* First-year standing in the veterinary curriculum or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

333. Veterinary Parasitology

Protozoan, arthropod, helminth parasites affecting domestic animals and humans; lectures, discussions, and laboratory. *Prerequisite:* Second-year standing in veterinary curriculum or 20 hours in chemistry or animal biology, or both; consent of instructor. 5 hours or 1 unit.

334. General Pathology

Cellular, organic, and systemic reactions to acute and chronic injury related to infections, circulatory disturbances, intoxications, parasitisms, immunologic disorders, metabolic disturbances, and disturbances of growth; lectures, demonstrations, and laboratories; microscope required (for those not in the professional curriculum). *Prerequisite:* Second-year standing in the veterinary curriculum or 25 hours of histology, physiology, para-

sitology, and microbiology, or consent of instructors (graduate students). 4 hours or 1 unit.

335. Special Pathology

Disease processes including specific diseases affecting organs and anatomic systems. *Prerequisite:* Second-year standing in veterinary curriculum or consent of instructor. 4 hours or 1 unit.

337. Veterinary Virology

Fundamental principles of animal virology; mechanisms of virus-cell and virus-host interactions; explores properties of the major groups of animal virus in relation to replication and pathogenesis of viral disease. Lecture and laboratory. *Prerequisite:* First-year standing in the veterinary curriculum or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

338. Veterinary Clinical Pathology

Discusses the function and interpretation of hematological, chemical, and certain other procedures, including exfoliative cytology, as aids in the diagnosis of animal diseases; emphasizes the correlation of laboratory findings with fundamental changes and clinical manifestations of disease. *Prerequisite:* Second-year standing in veterinary curriculum. 4 hours.

339. Veterinary Clinical Pathology Laboratory

Introduction to veterinary clinical pathology laboratory techniques in hematology, urinalysis, coagulation, clinical biochemistry and cytology, including sample procurement and handling, equipment, and methodology. *Prerequisite:* Second-year status in College of Veterinary Medicine or consent of instructor. 1 hour.

341. Food Safety and Public Health

Introduction to public health; diseases of animals transmissible to man; and procedures and techniques used in inspection of food of animal origin. *Prerequisite:* Second-year standing in veterinary curriculum or consent of instructor. 2 hours or $\frac{1}{2}$ unit.

343. Diseases of Poultry

The causes, symptoms, lesions, prevention, and treatment of noninfectious and infectious diseases of domestic birds; lectures, quizzes, and PLATO demonstrations. *Prerequisite:* Third- or fourth-year standing in veterinary curriculum or consent of instructor. 2 hours.

346. Principles of Laboratory Animal Science I

Same as BIOL and ANSCI 355. First of two course series. Addresses fundamental issues in Laboratory Animal Sciences including history, regulatory aspects, ethical considerations, and basic biology and husbandry of common laboratory animal species. *Prerequisite:* Second or third-year standing in the veterinary professional curriculum, registration in the graduate college, or consent of instructor. 1 hour or $\frac{1}{4}$ unit.

348. Veterinary Cytopathology

Same as V C M 348. Evaluation of slides prepared from body fluids, aspirates of abnormal skin or subcutaneous lesions, aspirates of internal organs, tracheal washes, and bronchial alveolar lavages for the purpose

VETERINARY PATHOBIOLOGY

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of determining the etiology of abnormal lesions or organ dysfunction. Microscopes are furnished. *Prerequisite:* VP 338, third or fourth-year standing in the veterinary curriculum. 2 hours.

350. Epidemiology

Principles and uses of epidemiology and biostatistics in the practice of veterinary medicine. *Prerequisite:* Second-year standing in veterinary curriculum. 2 hours or 1/2 unit.

355. Animal Necropsy Procedures

Instruction and practice in the performance of postmortem dissections; emphasizes the recognition of macroscopic pathologic changes on the assessment of their effects and on their diagnostic significance. For nonpathology majors only. *Prerequisite:* VP 334 and 335, and V C M 371; or equivalent; and consent of instructor. 1 or 2 hours, or 1/4 or 1/2 unit. May be repeated to a maximum of 6 hours or 1 1/2 units.

356. Principles of Laboratory Animal Science II

Same as BIOL and ANSCI 356. Continuation of VP 346. Additional topics include laboratory animal diseases, biohazard control, gnotobiology, and animal models of human disease. *Prerequisite:* VP 346 or equivalent, or consent of instructor. 1 hour or 1/4 unit.

360. The Biology of Emerging Infectious Diseases

Discusses the biology of emerging and re-emerging infectious disease pathogens; examples of various bacterial, parasitic, and viral pathogens are presented to characterize the diverse mechanisms and factors that enable these agents to emerge; possible corrective and/or preventative approaches are explored. *Prerequisite:* VP 331 or MCBIO 326; VP 332 or CSB 308; and VP 337 or MCBIO 351; or consent of instructor. 3 hours or 3/4 unit.

368. Clinical Rotation in Laboratory Animal Medicine

Elective clerkship in laboratory animal medicine for VM-4 professional students. The objective is to provide the senior veterinary student a broad practical exposure to the specialty of laboratory animal medicine. *Prerequisite:* Fourth-year standing or equivalent in the veterinary medicine professional curriculum. 2 1/2 hours. May be repeated in same semester to a maximum of 5 hours.

369. Veterinary Diagnostic Medicine

For VM-4 professional students, a veterinary diagnostic medicine clerkship in the Veterinary Diagnostic Laboratory. *Prerequisite:* Fourth-year standing or its equivalent in veterinary medical professional curriculum. 1 1/2 to 3 hours. May be repeated in the same or separate semesters to a maximum of 4 1/2 hours.

370. Computer-Based Information Competency for Veterinarians

Introduction to computer-mediated communication and information management tools of special interest to veterinary students and veterinarians. Satisfactory/unsatisfactory grading based on successful completion of

eight to ten projects covering e-mail, listservs and newsgroups, telnet, FTP, bibliographic database and World Wide Web searching, Web page authoring and publication, personal spreadsheets, and databases. Formal instruction and project submission via the Internet. Weekly help sessions available on-site. *Prerequisite:* Enrollment in the College of Veterinary Medicine professional curriculum. 2 hours.

371. Epidemiology and the Media

Same as CHLTH 371. Seminar based on student presentation of current epidemiological topics, followed by class discussion. Topics originate from popular media accounts, combined with information from original scientific communications. Outside speakers provide alternative views about the role of the media in presenting scientific issues. *Prerequisite:* One semester of epidemiology. 1 hour, or 1/4 unit to 1/2 unit.

374. Principles of Epidemiology

Same as CHLTH, ENVST and MED S 374. See CHLTH 374.

378. Veterinary Clinical Orientation

Same as V B and V C M 378. See V C M 378.

380. Molecular Mechanisms of Bacterial Pathogenesis

Introduction of current research literature on host-microbe interactions. The molecular basis for disease arising from these interactions will be stressed. *Prerequisite:* One or more 300- or 400-level courses in microbiology, immunology, or biochemistry, and consent of instructor. 2 hours or 1/2 unit.

391. Biostatistics

Same as BIOL and CHLTH 391. Application of statistical methods to epidemiology, clinical and diagnostic medicine, and laboratory biomedical experiments. Topics include descriptive statistics and graphics, reliability, sample size estimation, contingency table analysis, analysis of group differences, survival analysis, correlation, and linear regression. Emphasizes use of computerized statistical software in biomedical data analysis. 4 hours or 1 unit. Students may not receive credit for both VP 391 and CPSC 340 or BIOL 371 or EDPSY 390.

392. Special Problems

Individual research on a special problem chosen in consultation with the instructor and department head. *Prerequisite:* Registration in veterinary curriculum with GPA of 3.0 or above, or consent of instructor. 1 to 3 hours, or 1/4 to 3/4 unit. May be repeated to a maximum of 6 hours or 1 unit.

393. Economics of Food Animal Health

Concepts and procedures for economically driven decision-making with special emphasis on veterinary medicine. Topics will include: partial budgeting, enterprise budgeting, break-even analysis, decision analysis, production economics, computer modeling, and benefit-cost analysis. Published scientific literature will be reviewed to provide practical examples of economic decision-making in optimizing animal health management. *Prerequisite:* Graduate standing in CVM; VP 350

or equivalent epidemiology course (requires third-year standing in the professional curriculum); or consent of instructor. 3 hours or 3/4 units.

394. Veterinary Pathobiology

To be used to designate a trial or experimental course for five or more students, designed to be an elective in the CVM professional curriculum. The course can be taught under this designation for two years or two offerings, whichever time is greater. *Prerequisite:* Registration in the veterinary curriculum or consent of instructor. 1 to 3 hours. May be repeated to a maximum of 6 hours.

411. Seminars in Production/Population Medicine

Same as V C M 411. Discussion of selected topics and journal articles related to production and population medicine, i.e. health and disease control/prevention decisions that are based on improving productivity, profitability, and maintaining populations of animals. Requires presentation of a formal seminar to receive a letter grade. *Prerequisite:* Graduate standing in CVM; VP 350 or equivalent epidemiology course (requires third-year standing in the professional curriculum) and consent of instructors; for graduate students outside CVM, consent of instructors required. 1 hour or 1/4 unit. May be repeated in separate semesters to a maximum of 4 hours or 1 unit. Approved for S/U grading.

412. Seminars in Eukaryotic Microbiology

Discussion of selected journal articles about findings in the areas of molecular biology, immunology, cell biology, and biochemistry of eukaryotic microorganisms. Pathogenic and nonpathogenic organisms will be discussed, i.e.: Trypanosomatids, toxoplasma, malaria, pneumocystis, candida, neurospora, etc. Requires the presentation of a formal seminar. *Prerequisite:* VP 437 and/or consent of instructor. 1/4 unit. May be repeated in separate semesters to a maximum of 1 unit.

413. Biomedical Grant Proposal Writing

Objective of the course is to help develop skills in grant seeking and proposal writing. General information about identification of funding agencies, areas of research and program priorities, components of a grant application, internal institutional review process (i.e., animal care and recombinant DNA), formats, and the review process will be given. The major assignment will consist of a grant proposal writing project carried out with close consultation of the instructor. *Prerequisite:* Consent of instructor. 3/4 unit. Due to the nature of this course, enrollment will be limited.

414. Free Radicals in Biology

Same as BIOCH 414. Discussion of oxygen radical reactions in simple chemical and biochemical systems, the role of defenses against oxidative stress, physiological, pharmacological, toxicological, and pathological aspects of oxygen radicals. *Prerequisite:* Consent of instructor. 1 unit.

415. Mechanisms of Microbial Infections

Newer concepts of host-microorganism relations; emphasis on the dynamics and pathogenic mechanisms of microorganisms, immune responses and defense factors of the host, and pathogenesis of specific infections. Lectures, discussions, laboratory, and special problems. *Prerequisite:* MCBIO 326 or VP 332, or equivalent; consent of instructor. $\frac{3}{4}$ or 1 unit.

416. Epidemiology of Infectious Diseases

Same as CHLTH 476. Ecology of infection and disease; spread of disease and modes of transmission; methods of control; socioeconomic consideration; selected diseases: malaria, Lyme disease, anaplasmosis, schistosomiasis, salmonellosis, pseudorabies, AIDS. Student presentations. *Prerequisite:* Epidemiology class (VP 350, CHLTH 374 or equivalent), or consent of instructor. 3 hours or $\frac{3}{4}$ unit.

417. Principles and Methods of Veterinary Epidemiology

Same as CHLTH 477. Theoretical and applied principles of veterinary epidemiology; quantitative and computer-based methodology for evaluating disease risk, prognosis, and treatment at the individual and population level. A veterinary degree is not required for enrollment. *Prerequisite:* Graduate student standing. $\frac{3}{4}$ unit.

418. Concepts and Topics in Immunology

Same as BIOL 418. Newer concepts and theories in the field of immunology, including theories of antibody formation and immunological tolerance, regulation of the immune response, biosynthesis and structure of antibodies, and evolutionary aspects of the immune response. Lectures and discussion. *Prerequisite:* Consent of instructor; MCBIO 327 and CSB 308 recommended. $\frac{1}{2}$ unit.

419. Mechanisms of Viral Pathogenesis

Same as MCBIO 419. Lecture-discussion on topics of molecular mechanisms of viral pathogenesis. Mechanisms of infection, virulence, viral spread, interaction with the immune system, persistence, and other host-parasite relationships are covered using modern literature and in depth exploration of several animal virus systems. *Prerequisite:* MCBIO 330 and either MCBIO 351 or VP 337; BIOCH 350, 352 or 353; consent of instructor. $\frac{3}{4}$ unit.

420. Applied Epidemiology

Same as CHLTH 478. See CHLTH 478.

426. Statistical Techniques in Epidemiological Research

Same as CHLTH and ENVST 427, and MED 5463. See CHLTH 427.

427. Parasitology and Epidemiology Seminar

Discussion of selected historic and current literature related to parasitology. *Prerequisite:* VP 333; or concurrent registration in any one of these courses. $\frac{1}{4}$ unit. May be repeated to a maximum of $\frac{1}{2}$ unit.

437. Molecular and Immunoparasitology

The molecular basis of parasite function and host/parasite interaction with emphasis on recent developments. Topics include cell biology of parasites, molecular approach to rational chemotherapy, genetic and immunologic mechanisms of parasite survival, diagnosis, and vaccine development. Special attention to AIDS-related parasitic diseases. *Prerequisite:* Consent of instructor. 1 unit.

442. Laboratory Animal Medicine

Weekly clinical rounds, weekly or biweekly facilities rounds, and supervised clinical experience. Topics include: biology and husbandry of laboratory animals; diagnosis, treatment, and prevention of disease of laboratory animals; principles of animal use in research and teaching; and management and design of laboratory animal facilities. *Prerequisite:* DVM or equivalent or consent of instructor. $\frac{1}{4}$ to $\frac{3}{4}$ unit. May be repeated to a maximum of 4 units.

444. Immunobiological Methods

Same as ANSCI 444. Laboratory exercises, demonstrations, and discussions of methods and techniques in cellular immunology and immunobiology. *Prerequisite:* CSB 308 or MCBIO 327; or equivalent survey course in immunology or immunochemistry, or consent of instructor. $\frac{1}{2}$ unit. Registration is permitted by authorization of instructor.

445. Veterinary Diagnostic Pathology, I

Instruction in the performance of necropsy examinations; emphasizes recognition, interpretation, oral presentations, and written descriptions of gross and histologic lesions; emphasizes histologic features of lesions. For pathology majors only. *Prerequisite:* VP 334 and 335, V C M 369 or equivalent; consent of instructor. 0 to $\frac{3}{4}$ unit. May be repeated to a maximum of $2\frac{1}{2}$ units.

446. Veterinary Diagnostic Pathology, II

Instruction in the use of supplemental diagnostic data in the areas of bacteriology, clinical pathology, immunology, parasitology, toxicology, and virology in arriving at differential and definitive diagnoses; emphasizes pathogenesis of gross and histologic lesions and mechanisms of lesion development. *Prerequisite:* VP 445 or equivalent, or consent of instructor. 0 to $\frac{1}{2}$ unit. May be repeated to a maximum of $2\frac{1}{2}$ units.

447. Pathology Seminar

Discusses selected pathologic and clinico-pathologic material; requires presentation of a formal seminar. *Prerequisite:* Credit or concurrent registration in VP 445, and consent of instructor. 0 or $\frac{1}{4}$ unit. May be repeated to a maximum of $1\frac{1}{2}$ units.

450. Concepts in Pathology

Prerequisite: DVM degree or MS in Biology; consent of instructor. 1 unit.

451. Interpretive Cytopathology

Discusses selected cytologic material. Emphasizes recognition, interpretation, oral presentation, and written description of cytology case materials. *Prerequisite:* VP 338 and 348 or equivalent, and diagnostic cytology training

or consent of instructor. $\frac{1}{4}$ unit. May be repeated in subsequent semesters to a maximum of 2 units.

455. Comparative Oncology

Comparative study of the nature of mammalian and avian neoplasms based on general and special methods of tumor identification and classification; lectures, demonstrations, and laboratory. *Prerequisite:* VP 334 and 335, or equivalent. 1 unit.

456. Exotic and Wild Animal Diagnostic Pathology, I

Instruction in the performance of necropsy examinations on exotic and wild animals; emphasizes recognition, interpretation, oral presentations, and written descriptions of gross and histologic lesions; emphasizes histologic features of lesions. For pathology majors only. *Prerequisite:* VP 334 and 335; V C M 369 or equivalent; consent of instructor. $\frac{1}{4}$ or $\frac{1}{2}$ unit. May be repeated to a maximum of 22 units.

457. Exotic and Wild Animal Diagnostic Pathology, II

Instruction in the use of supplemental diagnostic data in the areas of bacteriology, clinical pathology, immunology, parasitology, toxicology, and virology in arriving at differential and definitive diagnoses of wild and exotic animals. Pathogenesis of gross and histologic lesions and mechanisms of lesion development are emphasized. For pathology majors only. *Prerequisite:* VP 456 or equivalent or consent of instructor. 0 to $\frac{1}{2}$ unit. May be repeated to a maximum of $2\frac{1}{2}$ units.

458. Exotic and Wild Animal Pathology Seminar

Discussion of selected pathologic and clinico-pathologic material pertaining to exotic and wild animals and presentation of a formal seminar. *Prerequisite:* Concurrent enrollment in VP 456 or 457 or consent of instructor. 0 to $\frac{1}{4}$ unit. May be repeated to a maximum of 1 $\frac{1}{2}$ units.

459. Surgical Pathology

Discusses and interprets disease processes of domestic animals; emphasizes interpretation of pathologic changes in tissue specimens obtained during surgical procedures; correlates structure, function, and prognosis. *Prerequisite:* VP 445 and 455, or equivalent; consent of instructor. 0 to $\frac{1}{2}$ unit. May be repeated to a maximum of $2\frac{1}{2}$ units.

475. Veterinary Information Technology and Computer Applications

Veterinary applications of word processing, spreadsheet, database, statistical, and health management software packages and various methods of information access and retrieval will be complemented by lecture/discussion and computer laboratory sessions. *Prerequisite:* Two years of work experience as a veterinarian (post-graduate DVM) or consent of instructor; priority will be given to students enrolled in the Executive Veterinary Program. $\frac{1}{4}$ unit.

476. Communication and Veterinary Consultation

Utilization of communication as a tool in veterinary consultation and management. Skills will be developed in oral and written communication through assigned presentations, technical reports, newsletters, and business letters. Veterinary applications will be emphasized. *Prerequisite:* Two years of work experience as a veterinarian (post-graduate DVM) or consent of instructor; priority will be given to students enrolled in the Executive Veterinary Program. $\frac{1}{4}$ unit.

477. Veterinary Leadership and Organizational Behavior

Leadership principles and organizational theory with practical application to veterinary management and consultation. Includes individual, interpersonal, and organizational influences focusing on current issues in the veterinary profession. *Prerequisite:* Two years of work experience as a veterinarian (post-graduate DVM) or consent of instructor; priority will be given to students enrolled in the Executive Veterinary Program. $\frac{1}{2}$ unit.

478. Veterinary Business Management

Instruction in and application of the principles of veterinary business management including economics, decision making, financial management, marketing, and legal issues. Emphasis on specific practice type (small animal, food animal, equine) depending on interest of students. *Prerequisite:* Two years of work experience as a veterinarian (post-graduate DVM) or consent of instructor; priority will be given to students enrolled in the Executive Veterinary Program. 1 unit.

479. Advanced Concepts in Swine Health Management, I

Instruction on the biostatistics involved in the effective analysis of swine production records, diagnostic tests, and clinical trials. Application of epidemiology principles in a swine production setting. Practical diagnostic, treatment, and preventive procedures for disease conditions related to swine production. *Prerequisite:* Two years of work experience as a veterinarian (post-graduate DVM) or consent of instructor; priority will be given to students enrolled in the Executive Veterinary Program. $\frac{3}{4}$ unit.

480. Advanced Concepts in Swine Health Management, II

Illustrate effective methods to monitor and analyze the effects environmental conditions have on swine health and productivity. Design and implementation of programs to ensure product quality and consumer safety. Swine nutrition and lean growth modeling for optimal use of rations and providing nutritional consultation to swine producers. Evaluation, development, and application of genetic programs for swine production. *Prerequisite:* Two years of work experience as a veterinarian (post-graduate DVM) or consent of instructor; priority will be given to students enrolled in the Executive Veterinary Program. 1 unit.

490. Seminar

Required of all graduate students whose major is veterinary pathobiology. 0 or $\frac{1}{4}$ unit.

491. Design and Analysis of Biomedical Experiments

Same as BIOL 491. Principles of sampling, treatment assignment, and statistical analysis applied to biomedical experiments; major emphases include sample size determination, dose-response functions, single and multifactor designs, randomized blocks and repeated measures, and analysis of covariance. *Prerequisite:* CPSC 340 or BIOL 371 or BIOL, CHLTH, NUTRS or VP 391, or consent of instructor. 1 unit.

492. Special Problems

Basic and applied study including orientation and research on pertinent initial and continuing problems in the student's area of interest. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ to 1 unit.

496. Interdisciplinary Toxicology Seminar

Same as ENVST and V B 496. Interdisciplinary seminar on topics within the area of toxicology; topics vary each semester. Seminars are presented by faculty, visiting lecturers, and students based upon their study, research, and/or professional activities in the selected topic area. *Prerequisite:* Consent of instructor. $\frac{1}{4}$ unit. May be repeated to a maximum of 2 units.

498. Nonthesis Research

Independent research to fulfill requirement for nonthesis alternative in Master of Science program only. *Prerequisite:* Must be enrolled in the departmental graduate program. $\frac{1}{4}$ to 2 units. May be repeated in subsequent semesters to a maximum of 2 units. Students may not receive credit for both VP 498 and 499.

499. Thesis Research

0 to 4 units.

WOMEN'S STUDIES

Director of Program: Sonya Michel

Program Office: 911 South Sixth Street, Campaign

Phone: 333-2990

URL: www.womstd.uiuc.edu

Women's Studies (W S)

111. Introduction to Women's Studies in the Humanities

Interdisciplinary introduction to women and gender. Analysis of representations of women (including race, class, and sexuality) in popular culture, painting, film, literature, music, history, religion. 3 hours.

112. Introduction to Women's Studies in the Social Sciences

Same as HDFS and SOC 145. The impact of culture and society on gender roles, including socialization and identity formation, as expressed in life-styles, marriage and family alternatives, and patterns of education and employment. 3 hours.

114. Contemporary Issues in Women's Studies

Explores the most recent debate and research related to contemporary issues which affect primarily women. Reviews issues related to sexual and domestic violence, gender socialization, feminization of poverty, women's health, sexual harassment, work and family, politics, and media influences from a multidisciplinary and multicultural perspective. 3 hours.

199. Undergraduate Open Seminar

1 to 5 hours. May be repeated.

201. Introduction to Feminist Theory

Interdisciplinary introductory survey of feminist theory. Traces developments in feminist theory and explores contemporary debates. 3 hours.

202. Women and Gender in Pre-Modern Europe

Same as HIST 202. See HIST 202.

219. Women in Japanese Literature

Same as EALC and C LIT 219. See EALC 219.

220. Psychology of Gender

Same as PSYCH 240. See PSYCH 240.

225. Women in Prehistory

Same as ANTH 225. See ANTH 225.

234. Brazilian Women's Words in Translation

Same as PORT 234. See PORT 234.

235. Women in Politics

Same as POL S 235. See POL S 235.

240. Sex and Gender in Classical Antiquity

Same as CLCIV 240 and C LIT 262. See CLCIV 240.

245. Women in the Labor Market

Same as ECON 245. See ECON 245.

250. Black Women: Histories and Cultures

Same as AFRO 250. Interdisciplinary study of black women's multiple histories and varied cultures including black women from North America, Africa, and the Caribbean. *Prerequisite:* AFRO 100 or W S 111 or 112 or consent of instructor. 3 hours.

260. US History of Medicine

Same as HIST 250. See HIST 250.

261. Women in East Asia

Same as EALC 261. See EALC 261.

262. Cultural Images of Women

Same as ANTH 262. See ANTH 262.

263. Introduction to Women and the Visual Arts in Western Culture

Same as ARTHI 260. See ARTHI 260.

271. African-American Women's History
Same as AFRO and HIST 271. See HIST 271.

272. Women, Men, and Gender in American Society to 1877
Same as HIST 272. See HIST 272.

273. Women, Men and Gender in American Society since 1877
Same as HIST 273. See HIST 273.

280. Women Writers
Same as ENGL 280. See ENGL 280.

286. Women in Popular Film and Television
Same as COMM 256. See COMM 256.

290. Individual Study
Special topics not treated in regularly scheduled classes. *Prerequisite:* One course in Women's Studies; consent of instructor. 0 to 3 hours. May be repeated to a maximum of 6 hours. Students may register in this course more than once in the same term.

302. Sex Roles
Same as HDFS and SOC 302. See HDFS 302.

303. Women in Muslim Societies
Same as ANTH, HIST, and RELST 303. See RELST 303.

324. Gender and Race in Contemporary Architecture
Same as ARCH 324. See ARCH 324.

332. Women and Language
Same as LING and SPCOM 332. See SPCOM 332.

335. Women's Health
Same as CHLTH 309. See CHLTH 309.

338. Psychology of Women
Same as PSYCH 338. See PSYCH 338.

341. Applications of Sex Role Theory to Counseling
Same as EDPSY 341. See EDPSY 341.

342. Body, Culture, and Society
Same as KINES 342. See KINES 342.

346. Gender and Physical Activity
Same as KINES 346. See KINES 346.

358. Social Issues Theatre
Same as THEAT 358. See THEAT 358.

370. Selected Topics on Women and Politics
Same as POL S 370. See POL S 370.

375. Women and Society in Scandinavian Literature
Same as C LIT and SCAN 375. See SCAN 375.

380. Gender Roles and International Development
Interdisciplinary seminar examining theoretical and empirical research on gender and the transformation of social and economic structures. Students will develop a comparative perspective on issues of women and public policy by contrasting and comparing such policies in North and South America, Eastern

and Western Europe, Asia, and Africa. *Prerequisite:* One course in Women's Studies or one course in international social, economic, or political development, or consent of instructor. 3 hours or 1 unit.

396. Seminar in Women's Studies
Interdisciplinary seminar on special topics in women's studies. *Prerequisite:* W S 111 or 112, and two courses in women's studies at the 200-300 levels; junior standing; or consent of instructor. 3 hours, or ½ to 1 unit. May be repeated once as topics vary.

401. Feminist Scholarship in the Humanities: Theory and Method
Interdisciplinary graduate-level course in feminist theory, with an emphasis on the humanities. Explores current debates in feminist theory as they pertain to humanities disciplines. *Prerequisite:* At least one graduate-level humanities course or consent of instructor. 1 unit.

402. Feminist Scholarship in the Social Sciences: Theory and Research
Same as SOC 425. Interdisciplinary feminist theory and research course with emphasis on the social sciences. Examines theoretical, methodological, and empirical research on sex, gender, and women in the social sciences. *Prerequisite:* Undergraduate statistics; at least one graduate-level social science course or consent of instructor. A graduate-level course in social science research methods is strongly recommended. 1 unit.

451. Women: Society and Social Welfare Issues
Same as SOC W 451. See SOC W 451.

460. Feminist Media Studies: Feminist Theory, the Media, and the Politics of the Popular
Same as COMM 460. See COMM 460.

463. Feminist Theory in Anthropology
Same as ANTH 463. See ANTH 463.



YIDDISH

(See Germanic Languages and Literature)

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Appendix A

Language Offerings

The following is a complete list of the languages regularly offered, together with the unit responsible for offering the course. Consult the listing for the unit for the specific courses offered in the language.

<i>Language</i>	<i>Unit responsible for the language</i>
African Languages	Linguistics
Arabic	Linguistics
Bamana	Linguistics
Bulgarian	Slavic Languages and Literature
Catalan	Spanish, Italian, and Portuguese
Chinese	East Asian Languages and Cultures
Coptic	Classics
Czech	Slavic Languages and Literature
French	French
German	Germanic Languages and Literature
Gothic	Germanic Languages and Literature
Greek (Ancient)	Classics
Hebrew	Linguistics
Hindi/Urdu	Linguistics
Icelandic (Old)	Germanic Languages and Literature
Italian	Spanish, Italian, and Portuguese
Japanese	East Asian Languages and Cultures
Korean	East Asian Languages and Cultures
Latin	Classics
Lingala	Linguistics
Persian	Linguistics
Polish	Slavic Languages and Literature
Portuguese	Spanish, Italian, and Portuguese
Quechua	Latin American and Caribbean Studies
Russian	Slavic Languages and Literature
Sanskrit	Linguistics
Serbo-Croatian	Slavic Languages and Literature
Spanish	Spanish, Italian, and Portuguese
Swahili	Linguistics
Swedish	Germanic Languages and Literature
Ukrainian	Slavic Languages and Literature
Wolof	Linguistics
Yiddish	Germanic Languages and Literature
Zulu	Linguistics

Other languages may be offered by tutorial in the following units:

- East Asian Languages and Cultures
- Germanic Languages and Literature
- Latin American and Caribbean Studies
- Linguistics

Appendix B

Rubric Abbreviations

Following is a list of official rubric abbreviations for courses currently approved for offering on the Urbana-Champaign campus of the University of Illinois.

AA E	Aeronautical and Astronautical Engineering	CHLTH	Community Health	LLS	Latino/Latina Studies Program
ACCY	Accountancy	CHP	Campus Honors Program	MATH	Mathematics
ACE	Agricultural and Consumer Economics	C & I	Curriculum and Instruction	MATSE	Materials Science and Engineering
ACES	Agricultural, Consumer and Environmental Sciences	CINE	Cinema Studies	MBA	Master of Business Administration
ADV	Advertising	CLCIV	Classical Civilization	MCB	Molecular and Cellular Biology
AFAS	Air Force Aerospace Studies	C LIT	Comparative Literature	MCBIO	Microbiology
AFLNG	African Languages	COMM	Communications	M E	Mechanical Engineering
AFRO	Afro-American Studies	COP	Coptic	MED S	Medical Sciences
AFRST	African Studies	CPSC	Crop Sciences	MET E	Metallurgical Engineering
AGCOM	Agricultural Communications	C S	Computer Science	MFG E	Manufacturing Engineering
AG E	Agricultural Engineering	CSB	Cell and Structural Biology	MIL S	Military Science
AG ED	Agricultural Education	CSE	Computational Science and Engineering	MUSIC	Music
ANSCI	Animal Sciences	CZECH	Czech	NEURO	Neuroscience
ANTH	Anthropology	DANCE	Dance	NRES	Natural Resources and Environmental Sciences
ARAB	Arabic	D LAW	Discovery Program in Law	N S	Naval Science
ARCH	Architecture	EALC	East Asian Languages and Cultures	NUC E	Nuclear Engineering
ARTCI	Cinematography	ECE	Electrical and Computer Engineering	NUMC	Maternal-Child Nursing
ARTCR	Crafts	ECON	Economics	NUMS	Medical-Surgical Nursing
ART&D	Introduction to Art and Design	ED PR	Educational Practice	NUPH	Public Health Nursing
ARTED	Art Education	EDPSY	Educational Psychology	NUPS	Psychiatric Nursing
ARTGD	Graphic Design	EDUC	Education	NUSC	Nursing Sciences
ARTGP	General Professional Courses in Art and Design	EEE	Ecology, Ethology, and Evolution	NUTRS	Nutritional Sciences
ARTHI	History of Art	E I L	English as an International Language	PERS	Persian
ARTID	Industrial Design	ENG	Engineering	PHIL	Philosophy
ARTPA	Painting	ENG H	Engineering Honors	PHYCS	Physics
ARTPH	Photography	ENGL	English	PHYSL	Physiology
ARTPR	Printing	ENTOM	Entomology	PL BIO	Plant Biology
ARTSC	Sculpture	ENVST	Environmental Studies	PL PA	Plant Pathology
AS ST	Asian Studies	EOL	Educational Organization and Leadership	POL	Polish
ASTR	Astronomy	E P S	Educational Policy Studies	POL S	Political Science
ATMOS	Atmospheric Sciences	E S L	English as a Second Language	PORT	Portuguese
AVI	Aviation	F A A	Fine and Applied Arts	PSYCH	Psychology
B ADM	Business Administration	FIN	Finance	REES	Russian and East European Studies
BIOCH	Biochemistry	FR	French	REHAB	Rehabilitation Education
BIOEN	Bioengineering	FSHN	Food Science and Human Nutrition	RELST	Religious Studies
BIOL	Biology	G C	Graduate College	RHET	Rhetoric and Composition
BIOPH	Biophysics	G E	General Engineering	RMLNG	Romance Linguistics
BR	Bridge Program	GEOG	Geography	R SOC	Rural Sociology
B&T W	Business and Technical Writing	GEOL	Geology	RUSS	Russian
BULG	Bulgarian	GER	German	SANSK	Sanskrit
BUS	Business	GMC	Germanic	SCAN	Scandinavian
CAS	Center for Advanced Study	GRK	Greek	S CR	Serbo-Croatian
CATAL	Catalan	HCD	Human and Community Development	SLAV	Slavic
CATH	Roman Catholic	HDFS	Human Development and Family Studies	SOC	Sociology
CEE	Civil and Environmental Engineering	HEBR	Hebrew	SOC S	Social Science
CER E	Ceramic Engineering	HINDI	Hindi	SOC W	Social Work
C I C	Committee on Institutional Cooperation	HIST	History	SPAN	Spanish
CH E	Chemical Engineering	HRE	Human Resource Education	SPCOM	Speech Communication
CHEM	Chemistry	HUMAN	Humanities	SP ED	Special Education
CHIN	Chinese	IB	Integrative Biology	SPSHS	Speech and Hearing Science
		I E	Industrial Engineering	STAT	Statistics
		ITAL	Italian	T A M	Theoretical and Applied Mechanics
		JAPAN	Japanese	THEAT	Theatre
		JOURN	Journalism	TSM	Technical Systems Management
		KINES	Kinesiology	UKR	Ukrainian
		KOREA	Korean	U P	Urban and Regional Planning
		L A	Landscape Architecture	V B	Veterinary Biosciences
		L A S	Liberal Arts and Sciences	V C M	Veterinary Clinical Medicine
		LA ST	Latin American and Caribbean Studies	V M	Veterinary Medicine Courses
		LAT	Latin	VP	Veterinary Pathobiology
		LAW	Law	VPD	Veterinary Pathobiology Discovery
		LEIST	Leisure Studies	W S	Women's Studies
		LING	Linguistics	YDSH	Yiddish
		L I R	Labor and Industrial Relations		
		LIS	Library and Information Science		



WHERE TO WRITE OR TELEPHONE FOR INFORMATION

ADMISSION FOR UNDERGRADUATES (and to obtain timetables): Admissions and Records, University of Illinois at Urbana-Champaign, 901 West Illinois Street, Urbana, IL 61801, (217) 333-0302. URL: <http://www.oar.uiuc.edu/>

ADMISSIONS INFORMATION AND APPLICATIONS FOR GRADUATE STUDENTS: Graduate College, University of Illinois at Urbana-Champaign, 202 Coble Hall, 801 South Wright Street, Champaign, IL 61820, (217) 333-0035; or the prospective department. URL: <http://www.grad.uiuc.edu>

CAMPUS INFORMATION: Information Desk, Illini Union, University of Illinois at Urbana-Champaign, 115 Illini Union, 1401 West Green Street, Urbana, IL 61801, (217) 333-INFO (4636). URL: <http://www.uiuc.edu/>

CAMPUS LIFE AND STUDENT WELFARE: Office of the Dean of Students, University of Illinois at Urbana-Champaign, 300 Turner Student Services Building, 610 East John Street, Champaign, IL 61820, (217) 333-0050. URL: <http://www.odos.uiuc.edu>

CAMPUS TELEPHONE NUMBERS: University Telephone Directory Assistance, (217) 333-1000.

EMPLOYMENT ASSISTANCE: Student Financial Aid, University of Illinois at Urbana-Champaign, Student Services Arcade, 620 East John Street, Champaign, IL 61820, (217) 333-0600. URL: <http://www.osfa.uiuc.edu/employ.htm>

FINANCIAL ASSISTANCE: Student Financial Aid, University of Illinois at Urbana-Champaign, Student Services Arcade, 620 East John Street, Champaign, IL 61820, (217) 333-0100. URL: <http://www.osfa.uiuc.edu/>

GRADUATE STUDENT MINORITY AFFAIRS: Graduate College Minority Student Affairs Office, University of Illinois at Urbana-Champaign, 201 Coble Hall, 801 South Wright Street, Champaign, IL 61820, (217) 333-4860. URL: <http://www.grad.uiuc.edu/minorityaffairs/>

HOUSING: Office of Certified Housing/Housing Information, University of Illinois at Urbana-Champaign, 400 Clark Hall, 1203 South Fourth Street, Champaign, IL 61820, (217) 333-1420. URL: <http://www.housing.uiuc.edu/>

MOTOR VEHICLE AND BICYCLE REGISTRATION: Campus Parking and Transportation, University of Illinois at Urbana-Champaign, 1110 West Springfield, Urbana, IL 61801, (217) 333-3530. URL: <http://www.parking.uiuc.edu/>

OTHER INFORMATION: Public Affairs, University of Illinois at Urbana-Champaign, Swanlund Administration Building, 601 East John Street, Champaign, IL 61820, (217) 333-5010. URL: <http://www.uiuc.edu/unit/pa/>

STUDENTS WITH PERMANENT DISABILITIES: Rehabilitation Education Services, University of Illinois at Urbana-Champaign, 1207 South Oak Street, Champaign, IL 61820, (217) 333-4602. URL: <http://www.rehab.uiuc.edu/>

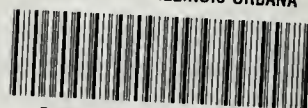
VETERANS' EDUCATIONAL BENEFITS: Veterans' Educational Benefits, University of Illinois at Urbana-Champaign, Student Services Arcade, 620 East John Street, Champaign, IL 61820, (217) 333-0100.

CHICAGO CAMPUS: Admissions and Records, University of Illinois at Chicago, 1200 West Harrison, Suite 1100, Chicago, IL 60607-7161, (312) 996-4350. URL: <http://www.uic.edu/>

SPRINGFIELD CAMPUS: Office of Enrollment Services, P.O. Box 19243F 20, Springfield, IL 62794-9243, (217) 206-6626. URL: <http://www.uis.edu/>

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